April, 1950
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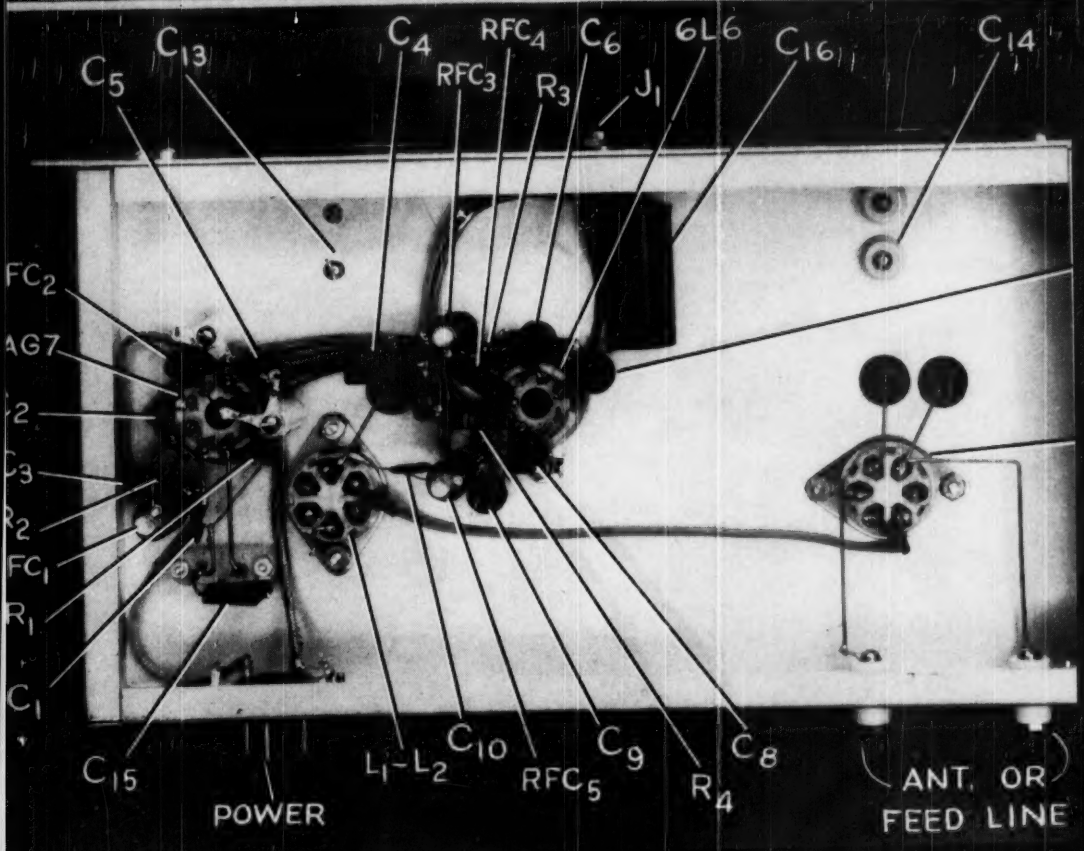


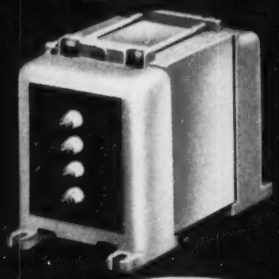
In This Issue — AN EASY-TO-BUILD TRANSMITTER FOR THE BEGINNER

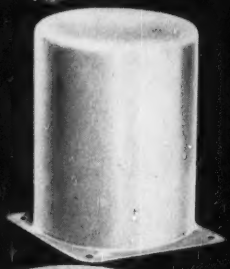
COMMERCIAL GRADE COMPONENTS

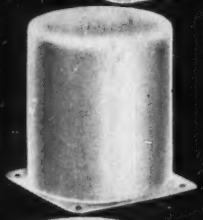
A wide range of units for every application

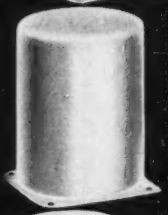
U.T.C. Commercial Grade components employ rugged, drawn steel cases for units from 1" diameter to 300 VA rating . . . vertical mounting, permanent mold, aluminum castings for power components up to 15 KVA. Units are conservatively designed . . . vacuum impregnated . . . sealed with special sealing compound to insure dependability under continuous commercial service.

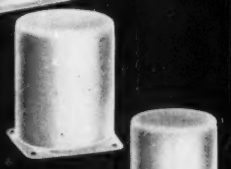
A few of the large number of standard C.G. units are described below. In addition to catalogued units, special C.G. units are supplied to customer's specifications.

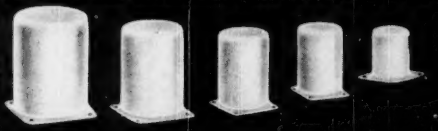












For full details on this line, write for Catalog

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Primary impedances from 500 to 20,000 ohms
Secondary impedances from 30,000 to 300 ohms

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CVM-1	30	60	6V6, 6B5, 2A3, 42, 46, 6L6, 210	14.00
CVM-2	60	125	801, 6L6, 809, 4-46, T-20, 1608	20.50
CVM-3	125	250	800, 807, 845, TZ-20, HK-30, 35-T	30.00
CVM-4	300	600	50-T, 203A, 805, 838, T-55, ZB-120	50.00
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(200 ohm windings are balanced and can be used for 250 ohms)

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133	2 plates to 2 grids	30,000 P to P	80,000 overall 1.6:1 ratio overall	12.50
134	Line to 1 grid hum-bucking	50, 200, 500	80,000	12.50
135	Line to 2 grids hum-bucking	50, 200, 500	120,000 overall	13.50
235	Line to 1 or 2 grids, hum-bucking; multiple alloy shielded for low hum pickup	50, 200, 500 ohms	80,000 overall	17.50
136	Single plate and low impedance mike or line to 1 or 2 grids Hum-bucking	15,000, 50, 200	80,000 overall	13.50
233	PP 6C5, 56, similar triodes to AB 45's, 2A3's, 6L6's, etc.	30,000 P to P	25,000 overall .9:1 ratio overall	11.00
333	PP 6C5, 56, similar triodes to fixed bias 6L6's	30,000 P to P	7,500 overall 5:1 ratio overall	11.00
433	PP 45, 2A3, similar tubes to fixed bias 2 or 4 6L6's	5,000 P to P	1,250 overall 5:1 ratio overall	12.00
137	Mixing	50, 200, 500	50, 200, 500	10.00
140	Triode plate to line	15,000	50, 200, 500	12.00
141	PP triode plates to line	15,000	50, 200, 500	13.50

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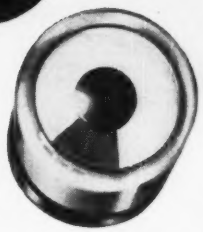
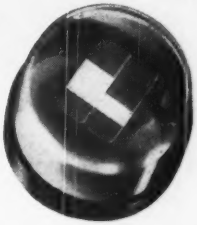


6E5

6U5



6AL7-GT

LET the flashing speed of electrons measure for you! Tubes are faster than a meter . . . besides, meters are damped, so won't respond readily to transient phenomena. You can use an oscilloscope for visual measurement, yes—but then cost lifts its head. Balance the price of a 'scope against the receiving-tube cost of any of the Ken-Rad indicator types! Your pocketbook will feel the difference.

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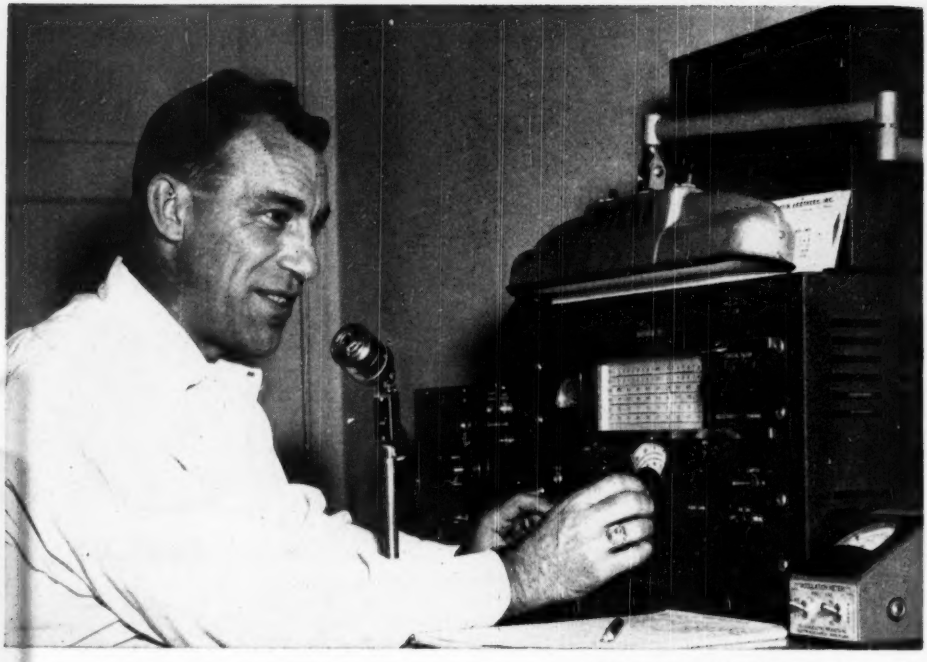

John A. Lang, W7KHU, Reno, Nevada

W7KHU appraises the 75A-1

After owning and operating a Collins 75A-1 for several months, John Lang, W7KHU, wrote us recently as follows:

"From the standpoint of stability, selectivity and all around fine performance, the 75A-1 is the best receiver it has ever been my pleasure to work with. I have turned the receiver on, zero beat WWV, and after an hour the 75A-1 is still zero beat with WWV. The tuning system provides the most accurate calibration I have ever seen. Another important point is the performance of the crystal filter. Signals that sound as though they are zero beat with each other can be separated, and it is possible to copy either one of them without interference from the other.

"The noise limiting circuit is also extremely fine. The operation of this circuit is positive and does not distort the speech when in use. All in all, the Collins 75A-1 is the finest precision receiving equipment made for the ham, and I am mighty proud to be the owner of such a fine piece of gear."

See or write your nearest authorized Collins dealer. The net domestic price of the 75A-1 amateur receiver, complete with tubes and speaker in matching cabinet is $375.00.

Note: The price of the Collins 51J-1 communication receiver, announced last November and in the 1950 Radio Amateur's Handbook, is now $975.00 in rack panel mounting, complete with tubes. Speaker in matching cabinet is $15.00 extra. The 51J-1 mounted in table cabinet is $27.50 extra. The 51J-1 will be available to amateurs approximately April 1.

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APRIL 1950

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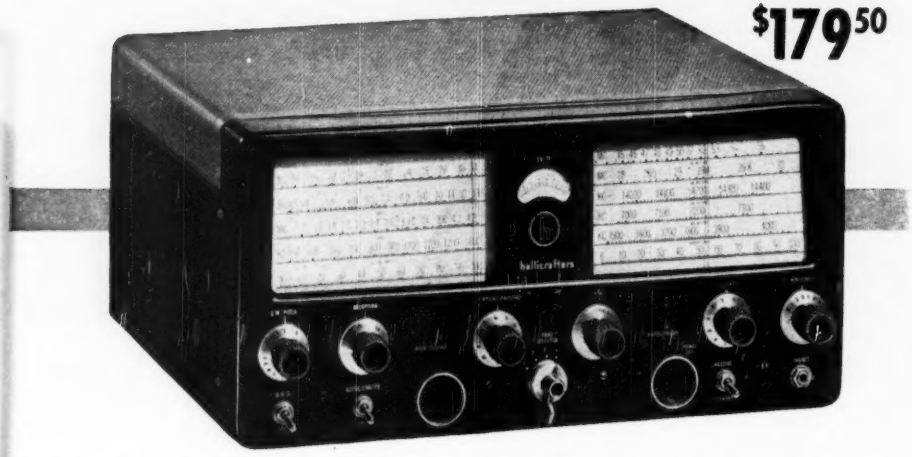

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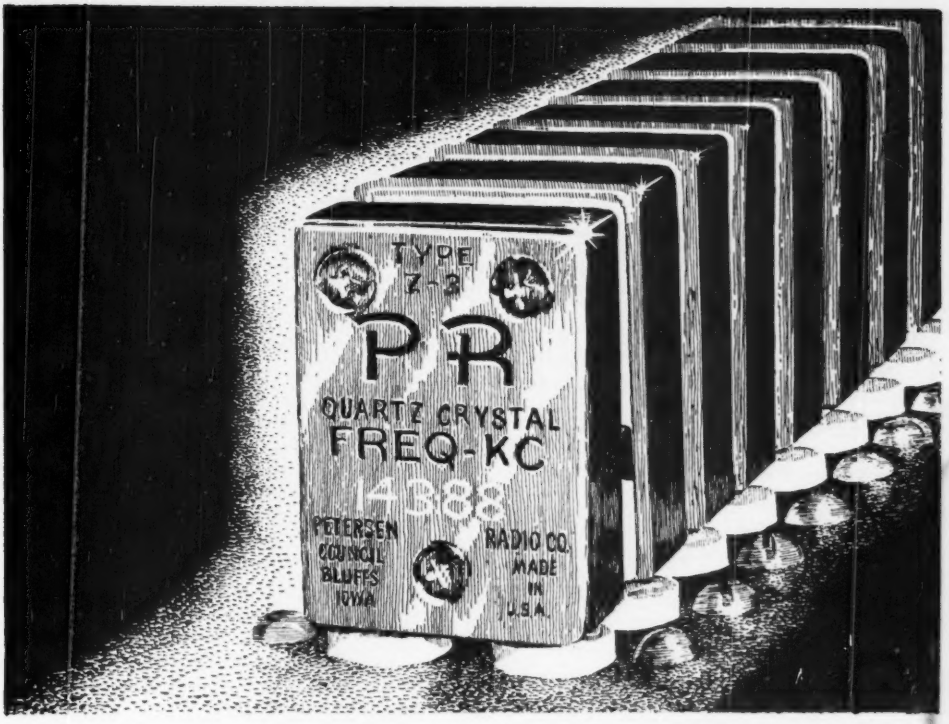

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Section Communications Managers of the ARRL Communications Department

Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio Club reports are also desired by SCMs for inclusion in *QST*. **All ARRL Field Organization appointments** are now available to League members. These include ORS, OES, OPS, OO and OBS. Also, where vacancies exist SCMs desire applications for SEC, EC, RM, and PAM. In addition to station and leadership appointments for Members, *all amateurs* are invited to join the ARRL Emergency Corps (ask for Form 7).

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is a noncommercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is noncommercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its board.

"Of, by and for the amateur," it numbers within its ranks practically every worth-while amateur in the nation and has a history of glorious achievement as the standard-bearer in amateur affairs.

Inquiries regarding membership are solicited. A bona fide interest in amateur radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not prerequisite, although full voting membership is granted only to licensed amateurs.

All general correspondence should be addressed to the Secretary at the administrative headquarters at West Hartford, Connecticut.

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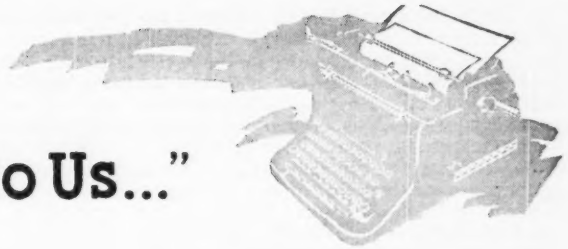
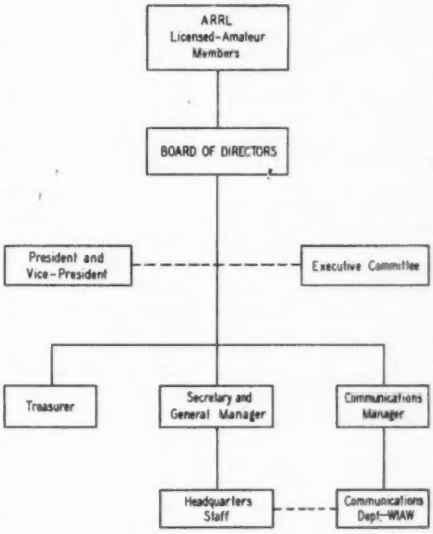
"It Seems to Us..."



LEAGUE CONTROL

When the League's Board of Directors meets each year in May it does a pretty good job of going over all the angles of current amateur problems, and members' discussions and reactions, endeavoring by this or that action to chart the most desirable course. At its meeting last May the directors were unanimous in thinking we ought to have something in *QST* that would outline the organizational structure of the League and make it plain to every ham that there is a mechanism which really does provide for the control of the League by the membership.

It happened we had just that sort of an article in the works, and perhaps you read it when we ran it subsequently in the July 1949 issue on this editorial page. We also covered this matter in detail when we wrote up our presentation to FCC in the document that constituted the League's first comment to the Commission on Docket 9295; that was run in the September 1949 issue. And, of course, antedating these was the superb treatment of the origins of the League and the development of its form of government that Ken Warner had expected to present to the Milwaukee National Convention back in '48; we still think this is one of the finest pieces of writing you'll ever set your eyes on, if you really want to know how the League got going and the thought that has been given to this very question of membership control: If you haven't read it — or even if you have — dig out November '48 *QST* and turn to page 33.



All in all, then, it would seem that members have had a pretty good chance to acquaint themselves with some of the background and details of administration of their organization, the League. Yet it is a fact that when we were visiting clubs and conventions on the West Coast last autumn we persistently ran into questions from fellows who wanted to know just how the League works and, even though they admitted to being League members, apparently had missed these articles we have just been talking about. Perhaps what might help, we've thought, was a somewhat different way of telling the story. Pictures always help, and while we don't know how to photograph the League's structure we have taken a crack at a chart. So here it is, and we hope it will be responsible for a better understanding of the control of ARRL affairs on the part of some of you who haven't noticed the other articles.

First of all we want to direct attention to that block at the top. That's where you and your fellow members of the League are. The block isn't at the top out of courtesy, either; it's there because everything in the League begins at that point and because everything having to do with the League stems from the membership. You can make the League, or break it. You, and you alone, elect directors to the Board. The Board thereafter has the authority to govern League affairs as a representative of the membership — *you*. It appoints the three paid officers of the League — the Secretary, Treasurer and Communications Manager — and fixes their sala-

ries. The Board doesn't hire the others of the nearly sixty employees at League Headquarters — that's the responsibility of the Secretary (who, under the Constitution, is also the League's General Manager) working in conjunction with the Treasurer and Communications Manager. But you can be pretty sure that if the Headquarters staff starts falling down on performance the three paid officers hear about it in a hurry! Your Board, not the Hq., is the sole authority in determining the policy of the League in all its working phases. We sometimes hear some loose talk about a "rubber stamp" Board, meaning, so far as we can find out, that the directors simply go along automatically with whatever Headquarters wants done. What we've never understood is by what mysterious means the Board is obliged to exhibit rubber-stamp characteristics toward the paid officers whose destinies it controls absolutely. (None of the paid officers is appointed for a definite term; their appointments can be terminated any time the Board feels like it.) In any event, however, any time the members of the division think their director is exhibiting characteristics which do not meet with general approval, all they have to do is to "unelect" him and put in his place somebody more to their liking.

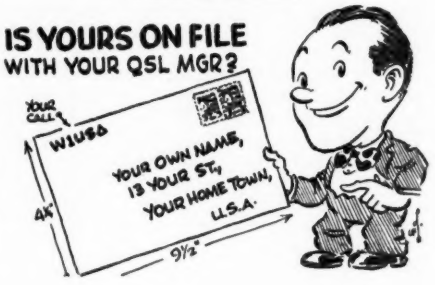
Getting back to the Board, it is just as responsive to your control as the rest of the lash-up in that diagram is subject to the actions of the Board. Directors don't just happen. Nor can they nominate themselves. It takes at least ten licensed amateur League members in a division to nominate somebody for director. But any ten Full Members can nominate anybody they please, provided only he meets the eligibility requirements which have been set up to ensure that directors are men of both amateur and League experience, and are free from any commercial connection with radio, etc. (All this is in the Constitution and By-Laws, a copy of which we will be glad to send you on request.) If you think you have a good man for the job of director (not excluding yourself!) and can get ten League members to go along with you, he's nominated. We run election notices soliciting just such nominations in the August and September issues of *QST* every year. That's as far as we can go — the rest is up to you.

We'd like to comment briefly on the business of voting for director. A director doesn't always get elected by a balloting of the membership; it may be that only one candidate was nominated and when that happens he is simply declared elected as the new director without any voting. This happens more often than you'd think. When there are several candidates in the field, however, every licensed amateur member of the League as of September 20th of the year concerned gets a ballot and a set of envelopes to send it back in. Unfortunately, it is a fact that an awful lot of members never exercise this basic right and responsibility in the League's organization. Over the years we'd say only an average of about fifty per cent of the membership votes, although this sometimes has gone as low as thirty-five or forty per cent and as high as nearly seventy per cent. We think there is a tendency to get out more of the vote in recent years, but we still deplore the fact that a great many members pass up an opportunity to decide for themselves what kind of a League we are going to have. We have had fellows tell us that "Oh well, one vote more or less isn't important." We don't agree. Moreover, we have had at least one director election in recent years that resulted in a tie, necessitating a rerun; a dozen or so votes could have changed the results in a number of other cases.

We have said it many times before on these pages but it is just as true as it has ever been — it is *your* League, OMs. The Headquarters staff, including the paid officers, isn't the League; it is solely a service organization operating under and responsible to the Board of Directors. But the directors aren't the League either; they exist only for and because of the membership. You, the members, are the League.

FEED-BACK

W1QPG calls our attention to the fact that the power-distribution system shown on page 30 of August, 1949, *QST* does not conform with underwriters' requirements. Should a plug develop a poor neutral contact, while the "hot" contact is maintained, there would be a potential of 115 volts between chassis and ground. If one side of the primary circuit is to be connected to chassis, as shown, a permanent independent ground connection to all chassis should be made. However, the safest arrangement is to disconnect the primary circuits entirely from the chassis, running the connections directly to the No. 3 plug prongs, and then connect the chassis to an independent ground.



A "Constant-Modulation" 'Phone System

Combining Efficiency and Economy in the 'Phone Transmitter

BY GEORGE R. LIPPERT,* W8YHR

• Here is a new method for obtaining a long-neglected system of modulation. It offers possibilities in lowered modulator-power requirements and high over-all efficiency, and thus merits consideration by every serious 'phone experimenter.

INTEREST in high-efficiency modulation systems always runs high in amateur circles, but most systems described in the past have suffered from complexity and the need for careful adjustment of the circuits. The most efficient one of the lot, single-sideband suppressed-carrier, suffers the further disadvantage that special tuning procedures are required at the receiving end. There is one system, however, that offers many advantages in amateur work, and yet it seems to have been neglected in recent years. This is the "controlled-carrier" system, first introduced to amateurs in 1935.[1]

Controlled-carrier systems enjoyed a short vogue and then dropped out of the picture. Several methods of generating controlled-carrier signals were developed at the time, but they lost out in favor of the present high-level plate-modulation systems. It is the purpose of this article to present a simple method for generating a controlled-carrier signal and to point out the advantages that have been forgotten or were never fully exploited.

Briefly, a controlled-carrier system is one that transmits only enough carrier at any instant to provide for distortionless detection at the receiver. As the voice level is raised the carrier level is raised accordingly, so that the percentage of modulation is always maintained at a high and efficient level. With no speech input, the carrier radiation is low, and heterodyne interference is decreased. The tubes run cooler because they are working hard only during actual transmission periods. This, in turn, means that *the power ratings of the tubes can be increased.* The power consumption is low, since the r.f. tubes draw plate current only when modulated, and this makes the system particularly attractive in mobile work.[2] A controlled-carrier signal can be amplified in a Class B amplifier with an efficiency approaching that of single-sideband suppressed-carrier work, because of the resting, or "cooling-off," periods, and this should be attractive to sufferers of TVI who have been looking at Class B r.f. amplifiers as a partial solution to their problem. The presence of a carrier reduces the available sideband power over that obtained with suppressed-carrier operation, but controlled-carrier signals amplified in Class B stages offer a big improvement over constant-carrier systems amplified in a similar manner.

A Simplified Circuit

Most of the earlier work with controlled-carrier transmitters used Class B modulation of the amplifiers, and required careful selection of tube types and operating conditions. However, using screen-grid modulation of a tetrode or

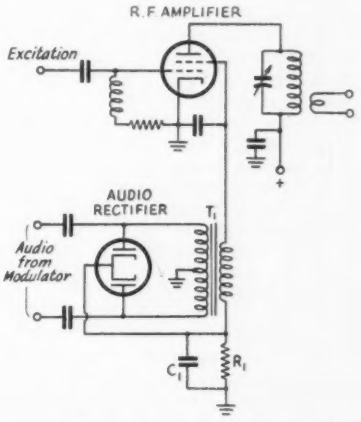


Fig. 1 — The basic circuit for constant-modulation or controlled carrier, using screen-grid modulation. Rectified audio power developed across C_1 furnishes d.c. screen voltage in proportion to the audio amplitude. With no speech, the power input to the r.f. amplifier is low and the output is low or negligible.

* 4654 Pearl Road, Cleveland 9, Ohio.

[1] Fyler, "'Phone Transmission with Voice-Controlled Carrier Power," *QST*, January, 1935.

[2] The oft-discovered system of removing the plate voltage from a Class C amplifier and modulating with a Class B amplifier is *not* a controlled-carrier system, although it is sometimes referred to by that name. In fact it isn't much of anything, since the audio is badly distorted, the modulation transformer load is not constant and the transformer may short-circuit operating in this unloaded condition, and there is no carrier for both halves of an audio cycle to work against. The fact that such modulation can be understood at all is less a recommendation for its sporadic discovery and use than a criticism of what passes for tolerable 'phone quality. — *Ed.*

pentode makes the thing quite a bit simpler. The basic circuit is shown in Fig. 1. The screen grid of the r.f. amplifier is modulated through the transformer, T_1. Normally the secondary of the transformer would be returned to the screen power supply, and the average screen voltage would be roughly one-half the normal operating value for c.w. However, in Fig. 1 the screen grid gets its d.c. from the voltage developed across C_1, which is rectified audio from the modulator. With no speech, there is no signal through the modulator, no voltage developed across C_1 and consequently little output from the amplifier. (There is some slight leakage through a screen-grid amplifier with the screen at cathode potential, but it can be reduced to any desirable minimum by returning C_1 and R_1 to the rectifier-winding center tap, and then inserting a negative voltage between center tap and ground.) When an audio signal comes through the modulator, it is applied to the screen grid through T_1. At the same time, however, some of the audio power is rectified in the audio rectifier and a voltage develops across C_1. If T_1 has a ratio of 2:1, the d.c. voltage across C_1 is one-half the peak-to-peak voltage developed across the secondary of T_1, and the screen is fully modulated. As the audio signal is increased, the d.c. voltage applied to the screen is increased in proportion, and the percentage of modulation remains constant over a wide range of audio amplitude.

The value of R_1 is unimportant, since it only serves as a d.c. path for the screen grid, to avoid blocking during no-modulation periods, and it can be made large enough to require insignificant power from the modulator. The value of C_1 must be large enough to maintain the screen voltage as well at low audio frequencies as at high ones, otherwise the percentage of modulation will be higher for the lower frequencies and speech will sound "bassy." The carrier will "hang on" slightly after a syllable, but the lag can be reduced to insignificance by proper choice of C_1 for the screen-grid tubes in use. A sudden decrease in audio amplitude will only cause a momentary decrease in the modulation percentage, until the d.c. drops to the level of the audio.

In a practical application, the circuit of Fig. 1 would result in audio distortion, because the condenser C_1 acts as a low-impedance load for the rectifier on the peaks of the audio cycles. The practical solution is to use a resistance- or inductance-input filter instead of the simple condenser, C_1. While this introduces a slight lag in carrier rise, the practical effect is negligible and overmodulation on the start of the first syllable is a rarity.

The plate current of the r.f. amplifier, as read on a meter, remains at a low value with no audio signal and kicks up with speech, in the same manner as the plate current of a Class B modulator stage. The screen-grid amplifier modulated as in Fig. 1 can be run at twice the input power on peaks as the same tube in plate-modulation service, by increasing the plate voltage, plate current, or both, so that the product of the peak plate voltage and current will equal the peaks in a plate-modulated stage.

The audio amplifier must supply the d.c.

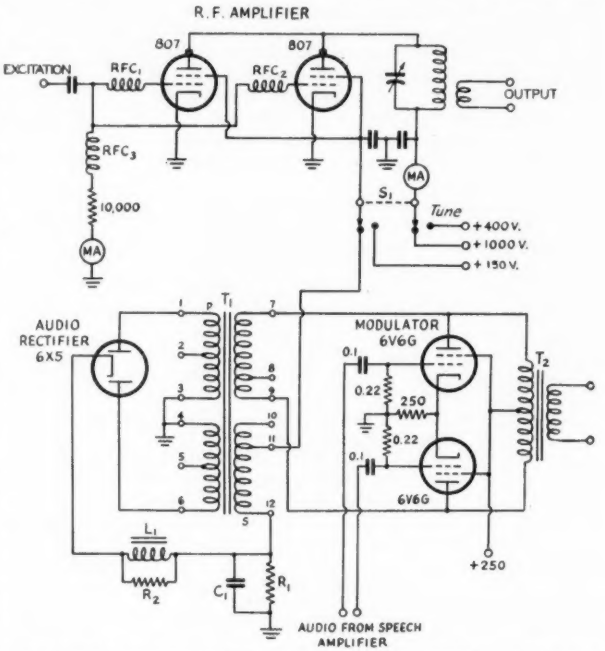


Fig. 2 — The constant-modulation circuit applied to screen modulation of a pair of 807s.

C_1 — 0.2 μfd., 400 volts.
R_1 — 0.1 megohm, 1 watt.
R_2 — 2700 ohms, 1 watt.
L_1 — 5-henry 85-ma. choke.
RFC_1, RFC_2 — Parasitic chokes, if necessary.
RFC_3 — 2.5-mh. r.f. choke.
S_1 — D.p.d.t. "tune-operate" switch.
T_1 — 15-watt universal modulation transformer (Merit A-3104).
T_2 — Push-pull output transformer, secondary not used.

power for the screens of the modulated tubes plus the audio to modulate them. In the case of two 807s the requirement is about 5 watts, compared with 40 watts necessary to plate-modulate the same tubes. In any case the audio power will be equal to about 1.5 times the d.c. power requirements of the screen grids.

In receiving a "constant-modulation" signal, the listener may or may not choose to use the receiver a.v.c. If a.v.c. is used, the receiver "S" meter will swing up sharply with modulation, and there is likely to be some distortion at times. In most cases it will be advantageous to turn off the a.v.c. and reduce the r.f. gain control, since heterodyne interference from adjacent signals will be reduced. Receivers with fast-acting a.v.c. systems will show less distortion than sluggish ones.

An Experimental Transmitter

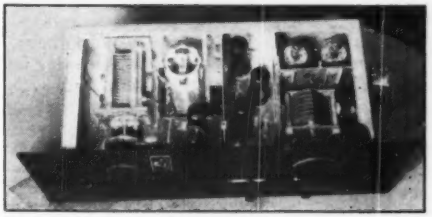
The transmitter shown in the photograph was built (with the exception of the audio section) by William Demeter, W8GMF. It was intended to be a medium-power exciter, but the parallel 807s in the output stage made it ideal for trying the constant-modulation circuit. The circuit of the output stage and modulation equipment is shown in Fig. 2, and it was only necessary to add the audio equipment, the 6X5 rectifier and an inexpensive modulation transformer to the W8GMF exciter.

One thing became obvious immediately. It is virtually impossible to tune and load the final in its normal operating condition, so S_1 was added to permit using low values of plate voltage and constant values of screen voltage during tune-up. The voltages were obtained from the audio-amplifier power supply and are not critical in value. The VFO, speech amplifier and power supplies are conventional and not shown here.

In figuring the modulation-transformer turns ratio, the ratio between the rectifier winding and the modulation winding (*11–12* in Fig. 2) is the most important because it determines the modulation percentage. Theoretically, one should have twice the turns of the other, assuming that the voltage across C_1 is the peak a.c. voltage and 100 per cent modulation is desired.[3] In practice, however, the condenser may not charge to exactly the peak value, and so the ratio should be slightly higher. In the experimental transmitter, a value of 2.2:1 was used. In this transmitter, assuming the screen-grid circuit of the 807s to show an impedance of 21,000 ohms, the modulator load is 7000 ohms when connected to a winding (*7–9* in Fig. 2) that has a 1:2 ratio to the rectifier winding. Since the transformer that was used had no center tap on this winding, the transformer T_2 is used as a center-tapped choke for feeding d.c. to the plates.

Tuning the Transmitter

To tune the transmitter, S_1 is switched to the "tune" position. This puts 400 volts on the plates of the 807s and 150 volts on the screens. The plate loading is adjusted to where the 807s draw about 60 ma. When S_1 is switched to the "operate" position, the plate voltage is increased to 1000, the screen voltage drops to 0 with no modulation, and the idling plate current is about 15 ma.



The r.f. section of the W8GMF transmitter that was used in the tests is also a good example of how surplus parts can be put to work.

A 60-watt lamp was used as a dummy load in the W8GMF transmitter. In the "tune" position the lamp glowed dimly, indicating an output power of about 15 watts. Upon switching to "operate" the lamp went out, although a wattmeter showed about 3 watts of carrier still present. Under full modulation the lamp would light to more than full brilliance. The plate current swings to about 150 ma. on peaks and runs around 100 ma. average under modulation.

Because the modulation percentage remains essentially constant regardless of audio amplitude, it can be seen that the audio gain control is also the power control. On local contacts the audio gain can be run at a low level, giving a low output.

Rudy Peronek, W8ZJH, has recently incorporated this system in a single 813 final with excellent results. The required audio power is about 5 watts and the maximum modulated power output is about 250 watts.

The writer wishes to express his gratitude to William Demeter, W8GMF, for his coöperation in testing this system in his transmitter.

[3] Tetrodes differ widely in their screen characteristics and it should not be assumed that all 807s (or 1625s) are capable of full screen modulation without distortion. The safest procedure is to check the screen-modulation limits of your tubes before deciding upon the transformer ratio. — *Ed*

SWITCH TO SAFETY!

A Two-Stage Transmitter for the Beginner

Thirty-Five Watts on 80 and 40

BY DONALD H. MIX,* WITS

FORTUNATELY, a satisfactory transmitter for a beginner in ham radio does not have to be as complex as a superhet receiver.[1] The greatest problem involved in the design is that of deciding where to stop. It is readily possible to obtain satisfactory results from a single tube. However, if the rig is limited to the oscillator alone, usually it will not be possible to utilize fully the capabilities of even the smaller-size power transformers. Therefore we are faced with the task of trying to strike a reasonable balance between simplicity and getting the most power in proportion to cost. A study of low-power b.c.-type transformers on the market shows that there is a roughly optimum point in the relationship between cost and power capability in transformers rated at 300 to 400 volts d.c. output at 100 to 150 ma. If we are to take full advantage of such a transformer, an amplifier will be necessary, because the power input to a crystal oscillator must be limited much below this figure to prevent damage to the crystal and assure good operating characteristics.

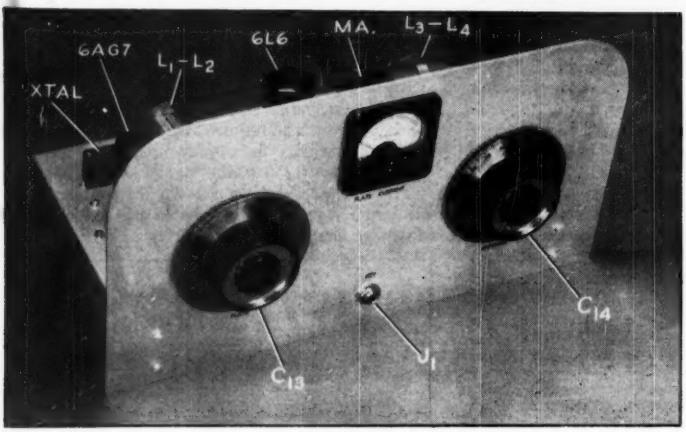
The usual type of amplifier is hardly to be recommended for a beginner. To cope with the well-known complications of stabilizing either triodes or screen-grid tubes is more than can reasonably be expected from one with little or no experience. The problem can be avoided by an arrangement in which the input circuit of the amplifier is not tuned to resonance. Although this system is not a highly-efficient one, it does overcome most of the handicaps imposed by a simple oscillator transmitter and the combination is considerably easier to handle, especially since the number of tuning controls is not increased.

The circuit diagram of the transmitter shown in the photographs is given in Fig. 1. The crystal-oscillator circuit is the triode Pierce which requires no tuning control. The screen of the 6AG7 serves as the customary triode plate. Through essentially electron coupling, the output is taken from an untuned plate circuit (RFC_2) which is reasonably independent of the oscillator circuit proper. The amplifier is coupled capacitively through C_4, and its output circuit is tuned to the desired operating frequency. Plate voltage is fed to the amplifier through the r.f. choke RFC_5 (parallel feed), rather than through the tank coil, to remove the danger of high-voltage d.c. on the coil. The transmitter is keyed in the common cathode lead of both tubes and a milliammeter is provided for checking the plate current of the amplifier. It is possible to dispense with the meter if necessary, but it is very useful in making proper adjustments.

A link-coupled antenna tuner is included. Series or parallel tuning may be used by proper strapping of pins in the base of the plug-in coil at L_4. The transmitter will handle a power input up to 30 or 35 watts compared with the few watts obtainable from a crystal oscillator alone.

* Assistant Technical Editor, *QST*.

[1] Mix, "A Beginner's Four-Tube Superhet Receiver," *QST*, March, 1950, p. 11.



A beginner's two-tube crystal-controlled transmitter for the 80- and 40-meter bands. The panel is a sheet of 1/16-inch aluminum 7½ inches high and 14 inches long. The dials are National type HRT-O.

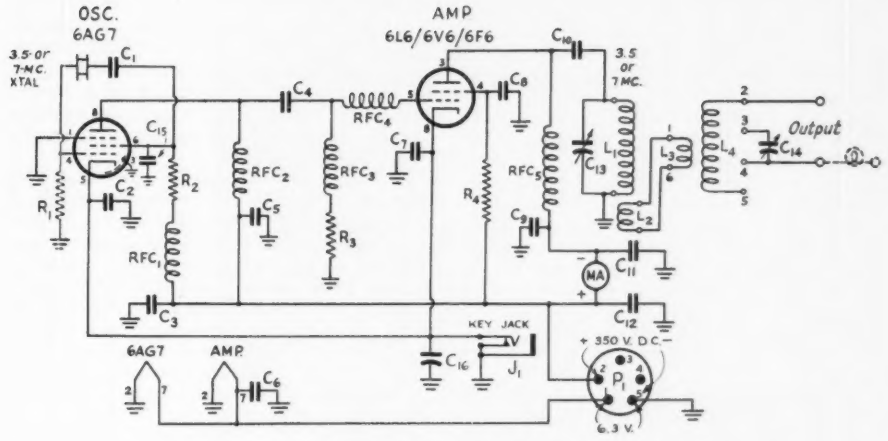


Fig. 1 — Circuit diagram of the beginner's two-tube transmitter.

C_1, C_2, C_3, C_5, C_6, C_7, C_8, C_9, C_{10}, C_{11}, C_{12} — 0.005-μfd. 500-volt disk-type ceramic (Sprague).
C_4 — 100-μμfd. mica.
C_{13}, C_{14} — 300-μμfd. variable (National STH-300).
C_{15} — 220-μμfd. mica.
C_{16} — 8-μfd. 450-volt electrolytic.
R_1 — 56,000 ohms, ½ watt.
R_2 — 22,000 ohms, 1 watt.
R_3 — 18,000 ohms, ½ watt.
R_4 — 18,000 ohms, 1 watt.
L_1 — 3.5 Mc. — 19 turns No. 22 wire, 1¼ inches diam., 1¼ inches long. L_2 — 4-turn link. (National AR17-40E.)
— 7 Mc. — 14 turns No. 16 wire, 1¼ inches diam., 1¼ inches long. L_2 — 4-turn link. (National AR17-20E with 9 turns removed from end opposite link.)
L_4 — 3.5 Mc. — 24 turns No. 22 wire, 1¼ inches diam., 1¾ inches long overall, ½-inch space at center. L_3 — 6-turn variable link. (National AR17-40S.)
— 7 Mc. — 12 turns No. 16 wire, 1¼ inches diam., 1½ inches long overall. L_3 — 5-turn variable link. (National AR17-20S.)
J_1 — Closed-circuit jack.
MA — D.c. milliammeter, 150- or 200-ma. scale.
P_1 — Five-pin chassis-mounting plug (Amphenol).
RFC_1, RFC_3, RFC_5 — 2.5-mh. r.f. choke (National R100-S).
RFC_2 — 100-μh. r.f. choke (Millen).
RFC_4 — 2-μh. r.f. choke (Millen R33).

Construction

The general construction of the transmitter is designed to match that of the beginner's superhet receiver described in the March issue.[1] Therefore the chassis and panel dimensions are the same and the unit will fit into a similar cabinet. As in the receiver, the exact placement of parts on top of the chassis is not critical. The two variable condensers, C_{13} and C_{14}, are placed at either end of the chassis to balance (shafts about 3 inches in from the ends). C_{14} must be insulated from the chassis, so it is mounted on Millen 32100 feed-through insulators which require ⅜-inch holes. C_{13} need not be insulated, but metal spacers are used to bring its shaft up level with that of C_{14}. The respective coil sockets are mounted directly behind the condensers, with their axes at right angles to minimize direct inductive coupling.

The sockets for the crystal and the oscillator tube are placed in the space at the left-hand end of the chassis and the amplifier tube an inch or two to the right of C_{13} and L_1. The Millen ceramic sockets require 1¼-inch holes. The oscillator socket is mounted with its key toward the front, while the key of the amplifier socket is toward the right. The amplifier-coil socket is turned so that the large Pins 1 and 6 are toward the right. The link prongs of the antenna-coil socket are to the rear. Two solder lugs should be placed under each socket-mounting nut for ground connections.

Clearance holes are drilled at the rear of the tuning condensers for the connecting wires. A hole is also required near the front of the chassis at the center for the wires running to the meter if one is to be used. A hole for the key jack is needed in the front edge of the chassis at the center. In the rear edge the power plug is mounted at the left-hand end and the two output terminals, which are a pair of ⅜-inch feed-through insulators similar to those mounting C_{14}, are at the opposite end.

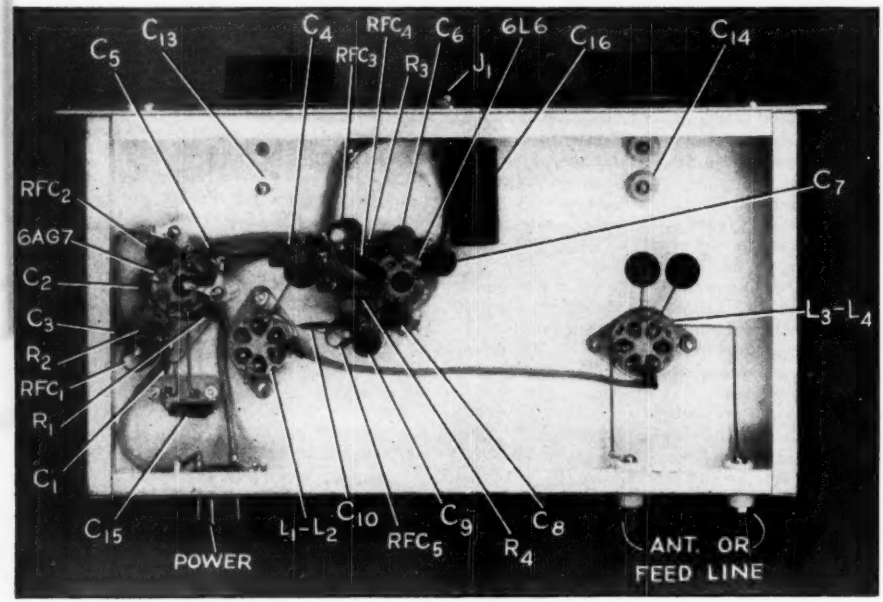
RFC_1, RFC_3 and RFC_5 are mounted with a single screw in the locations near the tube sockets shown in the bottom-view photo. A fiber lug strip is fastened under RFC_5 to provide an insulating anchorage for the bottom end of R_4. A ¾-inch ceramic cone insulator is fastened to the right-hand mounting screw of the 6AG7 socket (in bottom view), and another similar insulator is fastened to the chassis immediately above the socket. Two soldering lugs are fastened to the top of each insulator.

Wiring

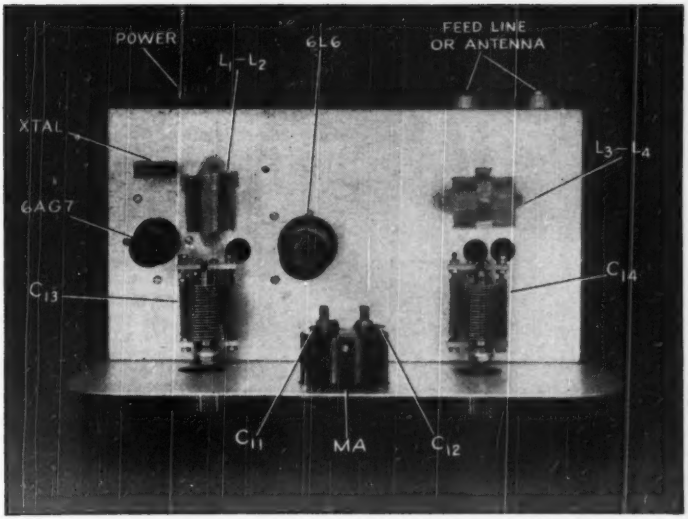
Experience has shown that even a low-power transmitter operating at 80 or 40 meters is capable of causing interference with television reception in the immediate neighborhood. Therefore, at least the most essential steps should be taken to reduce harmonics in the power-supply leads and the antenna. This consists of the use of shielded power wiring, low-inductance by-pass condensers with short leads, and the link-coupled antenna tuner. Under some circumstances it may be necessary to take further measures to suppress TVI, but those mentioned should suffice in most cases. In particular, it may be necessary to shield the transmitter by placing it in a metal cabinet. If this is done, the panel furnished with the cabinet will be used, rather than the one described, of course.

Shielded wire consists of an insulated conductor covered with copper braid. In using it, care must be exercised in keeping the ends of the copper braid away from contact with the inner conductor. In preparing the end of the wire, wrap three or four turns of No. 22 bare tinned wire (or cotton- or silk-covered magnet wire with the insulation removed will do) tightly around the shielding braid at about one inch from the end, leaving a lead of 2 of 3 inches at one end of the binding wire. Then fray the braid back to the binding and trim the braid off close with cutting pliers or shears. Flow solder around the turns of bare wire. Then remove the insulation from the end of the conductor for a distance of about ½ inch. This should leave about ½ inch of insulation between the conductor wire and the braid. Both ends of each piece of shielded wire should be prepared in the same way. The loose lead fastened to the shielding should be grounded to the chassis after the wire is installed.

Pins 1 and 2 of the amplifier-tube socket, Pins 1, 2 and 3 of the oscillator-tube socket, and Pin 2 of the amplifier-coil socket are connected directly to ground at one of the adjacent grounding lugs. Pin 5 of the power plug also is connected to the chassis. Then a short length of shielded wire is run from Pin 1 on the power plug to Pin 7 on the 6AG7 socket, and another section of shielded lead from there to Pin 7 on the amplifier-tube socket. Another section of shielded wire is run from Pin 2 on the power plug to the bottom terminal of RFC_1, another piece from there to the lug on top of the cone insulator holding RFC_2, another from this point to connect to R_4, and the last piece goes up through the chassis to connect the latter point to the positive terminal of the milliammeter. Another section of shielded wire runs from the negative terminal of the milliammeter back down to the bottom end of RFC_5. If a meter is not used, a connection is made directly from the fiber lug-strip termination of R_4 to the bottom end of RFC_5. The two cathode terminals of the tube sockets are connected together with shielded wire



Bottom view of the two-tube low-power transmitter. The chassis measures 7 by 13 by 2 inches.



Top view of the beginner's transmitter. The clearance holes for the wiring to the tuning condensers are lined with rubber grommets.

and another piece of shielded wire is run from Pin 8 on the amplifier-tube socket to the key jack. When the shielded wiring is completed, those wires running parallel, or crossing, should be spot-soldered together at intervals.

The various small by-pass condensers are installed next, soldering them directly between the tube-socket or r.f.-choke terminals and the nearest grounding lug with the shortest possible leads. R_1 is placed directly between Terminal 4 of the 6AG7 socket and ground, and R_3 between the bottom end of RFC_3 and ground. R_2 is connected between the top end of RFC_1 and Pin 6 of the 6AG7 socket. R_4 is wired directly between Pin 4 of the amplifier-tube socket and the fiber lug strip. C_{16} is connected between Pin 8 of the amplifier-tube socket and the grounded terminal of the key jack. A section of 75-ohm Twin-Lead or parallel-conductor lamp cord connects the link terminals of the coil sockets.

The top terminal of RFC_5 is wired to Pin 3 of the amplifier-tube socket and C_{10} is connected between the top of the same choke and Pin 5 of the amplifier-coil socket. RFC_4 is connected directly between the top terminal of RFC_3 and Pin 5 of the amplifier-tube socket.

The r.f. wiring, of which there is very little, should be done with stiff wire, No. 16 or larger. It should be kept well spaced from the chassis and other components. One wire connects one side of the crystal socket to Pin 4 of the 6AG7 socket. Another is run from the second crystal-socket terminal to Pin 6. After the wire is soldered in place, a ½-inch section is cut out of the center and C_1 is inserted.

A wire connects Pin 5 of the amplifier-coil socket to the rear stator terminal of C_{13}. C_4 is soldered between the top of RFC_3 and the anchoring lug on top of the second cone insulator near the 6AG7 socket. A short piece of wire runs from there to Pin 8 of the 6AG7 socket.

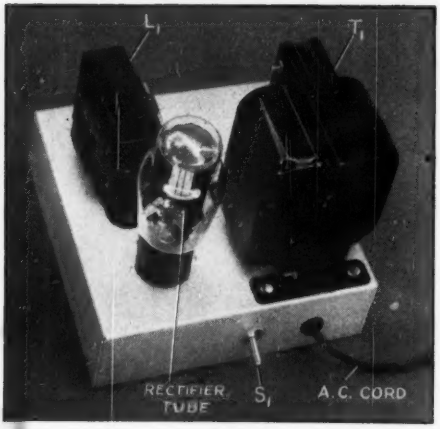
The antenna-coil socket is wired according to the pin numbering in Fig. 1.

The panel is fastened to the chassis with two machine screws at each end. A hole is required to match the hole in the chassis for the key jack. The 1¼-inch socket punch is used to make clearance holes in the panel for the shafts of the two tuning condensers. The hole for the meter can be cut with a circle cutter in a carpenter's brace. The size of the hole will depend upon the dimensions of the meter used, of course. The meter shown is of the 2-inch variety, but panel space is available for a 3-inch meter. After the meter wires have been connected, C_{11} and C_{12} should be added. They are connected directly between each meter terminal and the shielding braid of the meter wires. The braid of each meter wire is then grounded to one of the meter-mounting screws. Since the meter terminals are exposed high-voltage points, they should be covered with sleeves of rubber tubing to remove the hazard.

Power Supply

The circuit diagram of a suitable power supply for the transmitter is shown in Fig. 2. It will deliver 350 volts under a full load of 110 ma. Any other power supply delivering up to a maximum of 350 to 375 volts under load will do. Naturally, if the voltage applied to the transmitter is lower, the power output will be reduced correspondingly.

The unit shown is built on a 7 × 7 × 2-inch aluminum chassis. The components may be



The simple power supply for the beginner's transmitter.

placed in any convenient arrangement; the length of wiring leads is of no consequence. The only important point is to keep the line from the rectifier filament to the output socket (the positive high-voltage line) well insulated from the chassis. The output socket is set in one edge of the chassis so that it will line up with the plug in the transmitter, and the switch and a.c. cord are placed on the opposite side. Then the two units may be connected with a plug-in cable, or the power-supply unit can be plugged directly into the transmitter chassis.

Antennas

A single antenna can be made to serve for both 40 and 80 meters. It may take any one of several forms. Where space is available, the preferable antenna consists primarily of a horizontal wire one half wavelength long for 80 meters (approximately 135 feet) running in a straight line and elevated as high as possible. An antenna of this type is connected to the transmitter through a *transmission line* or *feeder line*, which is simply a pair of parallel wires spaced 2 to 6 inches. The feed line may be attached to the antenna at one end, as shown in Fig. 3C but, wherever it is at all feasible, it should be connected at the center, as shown in Fig. 3A. Where a choice in direction exists, the center-fed antenna should be run in a line at right angles to the direction in which it is most desired to work, while the end-fed antenna should be run in a direction approximately 45 degrees from the most-desired path.

If space does not permit running the antenna in a straight line, it may be bent to accommodate the length, or the ends may be dropped down, as shown in Figs. 3B and 3D. The angles at the bends should be as wide as possible. Although such bending will have some influence on the

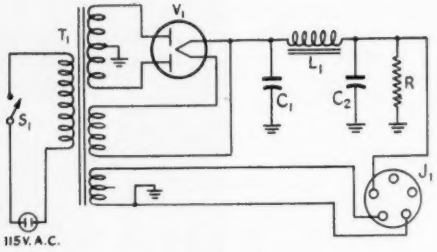


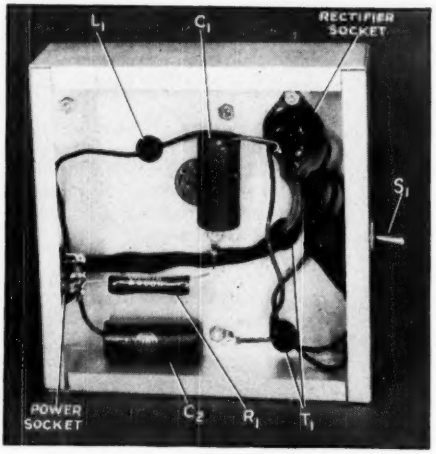
Fig. 2 — Wiring diagram of the power supply for the beginner's transmitter.

C_1 — 8-μfd. 500-volt electrolytic.
C_2 — 8-μfd. 450-volt electrolytic.
R — 50,000 ohms, 10 watts.
L_1 — 10.5-hy. 110-ma. filter choke (Stancor C1001).
J_1 — Five-prong chassis-mounting socket (Amphenol).
S_1 — S.p.s.t. toggle switch.
T_1 — Power transformer: 350 volts r.m.s. each side of center, 110 ma.; 6.3 volts, 4.5 amp.; 5 volts, 3 amp. (Stancor P4080).
V_1 — Rectifier — Type 80 or 5Z3.

performance of the antenna, it will still work quite well. The center-fed antenna is much more tolerant as to dimensions than one which is end fed. In restricted space, the horizontal antenna portion may be made as long as space permits and the deficiency in length added to the feed line, keeping the over-all length the same. It is not advisable to do this with the end-fed antenna.

When a feed line is used, power from the transmitter can be fed more readily to the antenna if the feed line is cut to certain lengths. These lengths together with other essential dimensions of various recommended systems are shown in the accompanying table.

Another type of antenna is known as the



Bottom view of the power supply.

Antenna Data Table				
	l_1	l_2	*80 M.*	*40 M.*
Figs. 3A and 3B	67 ft.	67 ft.	par.	par.
	33 ft.	33 ft.	ser.	par.
	$l_1 + b$ = 134 ft. (l_1 long as possible)		par.	par.
	$l_1 + b$ = 67 ft. (l_1 long as possible)		ser.	par.
Figs. 3C and 3D	134 ft.	67 ft.	ser.	par.
Fig. 3E	$l_1 + l_2$ = 67 ft. (l_2 short as possible)		ser.	par.
Fig. 3F	67 ft.	67 ft.	ser.	par.

Marconi antenna. This consists of a wire whose total length is one quarter wavelength instead of one half wavelength. For 80 meters this means a length of about 67 feet. This antenna is shown in Fig. 3E. When such an antenna is used, the remaining output terminal of the transmitter must be connected to a ground (such as a water pipe) or to another quarter wavelength of wire which may be suspended a few feet above the ground, as shown in Fig. 3F. It is not essential that the lower wire run exactly under the antenna.

The table of antenna dimensions also shows whether series or parallel tuning should be used, that is, whether C_{14} should be connected across L_4 or in series with it and the feed line.

The antenna may be strung between any existing supports, such as trees or buildings, or some type of mast may be used. When a feed line is used, the antenna may be of No. 12 or No. 14 antenna wire, while the feed line may be made of No. 16 wire to minimize the weight. Plastic spreaders are recommended for spacing the feeder wires because of their light weight. They can be obtained in several different lengths. When the feed line is long, the wider spacing will give less trouble from twisting. Fairly-strong glass insulators should be used for the antenna, especially if the antenna is to be strung between trees.

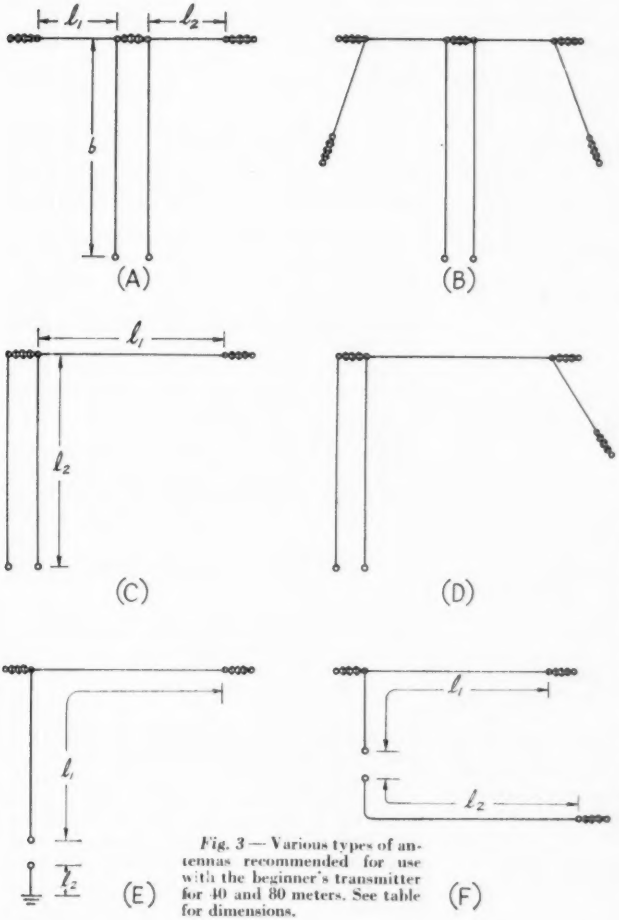


Fig. 3 — Various types of antennas recommended for use with the beginner's transmitter for 40 and 80 meters. See table for dimensions.

Adjustment

Aside from the 6L6, a 6V6 or 6F6 may be used in the amplifier without circuit change. The smaller tubes will not handle as much power as the 6L6, of course.

The power supply should be connected to the transmitter. The 80-meter coil should be plugged into the amplifier circuit and an 80-meter crystal placed in the crystal socket. The antenna-coil socket should be empty. With the power turned on, and the key plugged in and closed, the milliammeter should show a reading (100 to 150 ma. with a 6L6 and

(*Continued on page 104*)

Coupling Unbalanced to Balanced Lines

Simple Circuits for Both Fixed and Adjustable Impedance Ratios

BY CARY T. ISLEY, JR.,* W3OCZ

THE circuit shown in Fig. 1A has seen application in commercial equipment, but is not well known in amateur circles. The network provides for going from an unbalanced to a balanced load. The only conditions that the network constants must satisfy in order that that balanced drive exist across the output impedance are

$$L_1 = L_2 = \frac{1}{2\pi^2 f^2 C_1} \quad \begin{array}{l}\text{(mutual inductance between}\\ L_1 \text{ and } L_2 = \text{zero)}\end{array}$$

where f = nominal operating frequency.

If the foregoing conditions are satisfied the input impedance (assuming the Qs of inductances and capacity are much greater than unity) is as shown in Fig. 1B. This holds regardless of the type of load, bearing in mind that if the load is complex — i.e., is reactive as well as resistive — $Z_O/4$ also will be complex. Although C_1 may be adjusted to make the input impedance resistive, this does not, in general, balance the output load. It will be observed that since each inductance must have twice the reactance of the

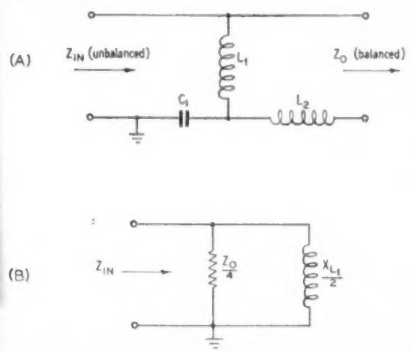


Fig. 1 — Network for coupling a balanced line to an unbalanced driving source (A) and the equivalent input impedance (B).

capacitance, by connecting the "free" end of each coil to ground the resulting circuit will be resonant at the operating frequency. Of course, if r.f. current or voltage indicators are placed in each leg of the output impedance, balance is easily obtained by adjusting C_1 until equal r.f. voltages or currents are obtained.

* 7360 Forest Road, Hyattsville, Md.

For a purely-resistive output impedance, the input impedance may be made resistive very simply by shunting the input terminals with a capacitor (C_2) having the same value as C_1. This is shown in Fig. 2. The network in Fig. 2 has a constant impedance-transformation ratio of 4 to 1, so the input impedance is directly determined by the value of the output load impedance. Thus, a 300-ohm load will provide an input impedance of 75 ohms; a 600-ohm load will provide an input impedance of 150 ohms; and so on. This network will serve nicely for feeding a 300-ohm folded dipole or driven element with 72-ohm coax.

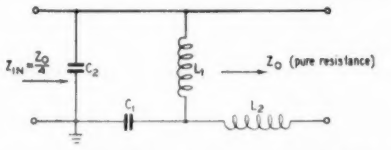


Fig. 2 — Balanced-to-unbalanced coupling circuit in which the input impedance is a pure resistance if the load is a pure resistance. This circuit gives an impedance step-down of 4 to 1 from the load to the driver. Suggested values for various bands are given in Table I.

Capacitors C_1 and C_2 could be a split-stator unit, thus requiring only one adjustment both for making the input impedance resistive and for balancing the output load.

Values of L and C may be anything that will satisfy the balance conditions. However, if it is desired to maintain network losses at a minimum, the inductance values should be chosen so that

$$L \cong \frac{Z_O}{10\,f} \qquad \text{(for resistive output load)}$$

where L = inductance in μh. of L_1 and L_2 separately,
f = frequency in Mc., and
Z_O = output load in ohms.

The capacitance at C_1 should be such as to resonate at the operating frequency with L_1 and L_2 connected in parallel. C_2 is made equal to C_1.

In my application, I wanted to feed a folded dipole via a 300-ohm line from an unbalanced link. With a 7-Mc. transmitter, it was found no rebalancing was necessary over the entire band after the network was once set to the middle of the band.

Other Impedance Ratios

If an input impedance different from that provided by the network of Fig. 2 is desired, the addition of a very simple quarter-wave network (using lumped constants) can transform the output load impedance to almost any desired input value. The quarter-wave network may have either of the configurations shown in Fig. 3. If R_1 and R_2 are both resistive, then

$$L_3 = \frac{\sqrt{R_1 R_2}}{2\pi f}$$

$$C_3 = \frac{10^6}{2\pi f \sqrt{R_1 R_2}}$$

If f is in Mc., L_3 will be in μh. and C_3 in $\mu\mu$fd.

Since L_3 and C_3 have the same reactance at the operating frequency, L_3 may be wound using one of the well-known inductance formulas and C_1 adjusted by checking resonance with one of the inductances at the operating frequency. Incidentally, harmonic attenuation is provided by the quarter-wave network, thus making it serve as an anti-TVI measure as well as providing the required impedance transformation.

As an example, assume it is desired to match a 300-ohm balanced line to 52-ohm coax at an operating frequency of 29 Mc. The complete network could be as shown in Fig. 4, where the component designations correspond with those of Figs. 2 and 3. Since Z_O is approximately resistive, optimum values are

$$L_1 = L_2 \overset{\infty}{=} \frac{300}{10 \times 29} \overset{\infty}{=} 1.0\ \mu\text{h}.$$

$$C_1 = C_2 \overset{\infty}{=} 60\ \mu\mu\text{fd}.$$

For the quarter-wave part of the network the inductance and capacitance values become

$$L_3 = \frac{\sqrt{52 \times 75} \times 0.159}{29} = 0.34\ \mu\text{h}.$$

$$C_3 = 90\ \mu\mu\text{fd}.$$

TABLE I

		3.5 Mc.	7 Mc.	14 Mc.	28 Mc.
For 600-Ohm Line (Z_{IN} = 150 Ω)	L_1 and L_2	16 μh.	8.4 μh.	4.2 μh.	2.1 μh.
	C_1 and C_2	230 μμfd.	120 μμfd.	60 μμfd.	30 μμfd.
For 300-Ohm Line (Z_{IN} = 75 Ω)	L_1 and L_2	8 μh.	4.2 μh.	2.1 μh.	1.0 μh.
	C_1 and C_2	450 μμfd.	240 μμfd.	120 μμfd.	60 μμfd.
For Transforming 150 Ω to 75 Ω	L_3	4.5 μh.	2.4 μh.	1.1 μh.	0.58 μh.
	C_3	400 μμfd.	210 μμfd.	115 μμfd.	55 μμfd.
For Transforming 150 Ω to 50 Ω	L_3	3.8 μh.	1.9 μh.	0.97 μh.	0.48 μh.
	C_3	480 μμfd.	260 μμfd.	130 μμfd.	67 μμfd.
For Transforming 75 Ω to 50 Ω	L_3	2.6 μh.	1.4 μh.	0.69 μh.	0.34 μh.
	C_3	700 μμfd.	355 μμfd.	180 μμfd.	90 μμfd.

Suggested values of L_1–L_2, C_1–C_2, L_3 and C_3 for various bands are given in Table I. As stated above, there is a considerable range of choice in the values for L_1–L_2 and C_1–C_2, the principal requirement being that L_1 and L_2 in parallel should resonate with either C_1 or C_2 at the operating frequency. The values of L_3 and C_3 are fairly critical, since they are determined by the required impedance transformation ratio. The coil dimensions can be found from the ordinary formulas for inductance or from the calculators available for the purpose, taking into account the amount of power to be carried. The capacitances can be adjusted to the correct values by checking resonance (with a grid-dip meter, for example, or by temporary coupling to the amplifier tank circuit) at the operating frequency.

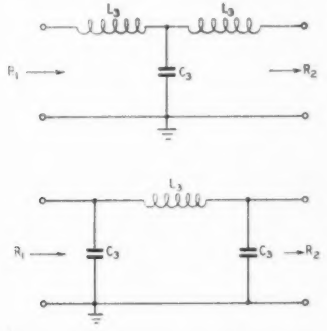


Fig. 3 — "Quarter-wave" circuits for impedance matching.

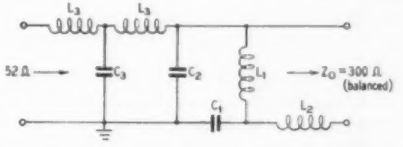


Fig. 4 — Balanced-to-unbalanced network combined with quarter-wave impedance matcher. Suggested component values are given in Table I.

SWITCH TO SAFETY!

Welding Aluminum with a Blowtorch

BY H. H. WASHBURN,* W3MTE

Beam construction at W3MTE has always involved loading a quantity of aluminum tubing into the W3MTE Crosley, driving to the nearest welding shop, and then trying to find a way to get the finished beam home. Some method of home welding was obviously in order.

In the construction of a two-meter plumber's delight gamma match, I wanted to use half-inch tubing for the boom, with quarter-inch tubing for elements. The boom was to be pushed through a half-inch hole in the end of a 1¼-inch mast section. I wanted to tack weld the elements in place, with no mechanical claptrap.

Co-worker Les Graffis mentioned that he had used die-cast welding rod and an oxyacetylene torch in mending cracked aluminum heads on Fords, and that the weld couldn't be knocked off with a hammer. Santa Claus had brought me a nice new gasoline blowtorch, and some experimenting was done. Results were excellent.

Here is the process:

1) Wire brush thoroughly the two pieces to be joined.

2) Heat with the blowtorch the larger of the two pieces; the heat will flow into the smaller piece.

3) Rub the die-cast welding rod on the joint until both pieces are tinned. Leave a small blob on the joint. Use no flux.

4) With a piece of iron wire, push the blob around until a smooth joint is obtained.

5) Allow to cool without movement.

A few notes are in order. Heating a heat-treated metal like 24ST draws the temper, but for light work it's satisfactory. Soon after the rod melts, the aluminum will blister, then collapse; *moral:* work fast and remove the torch as soon as possible. Support the work so that it is not under strain during the heating, or it will bend where you don't want a bend. Open the blowtorch fairly wide and keep the pressure up. The minimum setting may not melt the rod. Experiment with some scrap to get the hang of it before working on the middle of your new boom. *Wear gloves* — aluminum doesn't look hot, but it can burn you. The rod costs about $3.25 a pound, which comes to about 15 cents a stick.

As usual, a good coat of aluminum paint will protect the beam and retard corrosion caused by junctures of dissimilar metals. No experimenting has been done on iron or brass parts. It may work.

This process will never put the welding shops out of business, but it has its place in my ham shack and home workshop.

* Burton Ave., Lutherville, Md.

Silent Keys

It is with deep regret that we record the passing of these amateurs:

W1BKE, Philip P. Curtis, Lynn, Mass.
W1DZU, Conrad T. Beardsley, S. Portland, Me.
W1HXM, Clyde B. Bradshaw, Wollaston, Mass.
W1RXK, Gustave A. Eckman, Richmond, Me.
Ex-W2JY, Alfred Green
W3IET, Fred C. Hill, Rehoboth Beach, Del.
W4UUR, Charles N. Spang, Fort Thomas, Ky.
W5NUQ, Dr. H. P. Willoughby, Hagerman, N. M.
W6JOQ, Charles A. Huff, San Francisco, Calif.
W6NCR, Edward M. Corcoran, Artesia, Calif.
W7ASY, Kleon Dale, Seattle, Wash.
Ex-W8AEB, James Liebegott, Ducansville, Penna.
WØEYM, Norville W. Cook, Kansas City, Mo.
WØFPE, Clifford P. Lawrence, Cedar Rapids, Iowa
WØTGK, Jay A. Karr, Adel, Iowa
G3CMD, Eric G. Clarke, Felixstowe, Suffolk
Ex-HA5C, Bela Takacs
KH6DJ, ex-K6QLG, Henry D. Kalehuawehe, Wailuku, Maui

Eliminating TVI with Low-Pass Filters

Part III† — *Simplified Filter Design by Graphical Methods*

BY GEORGE GRAMMER,* W1DF

FILTER design on a general basis requires using the appropriate formulas for calculation of the filter constants, as described a few months ago in *QST*.[17] However, where a specific frequency range and a specific purpose are given, it is possible to present practically all the design information in the form of graphs or charts from which the required values can be read without calculation. The TVI filter meets these conditions nicely, since the only frequency range that needs much consideration is 54–88 Mc., and the type of filter considered will be of the low-pass type for coaxial line, having a cut-off frequency between 20 and 54 Mc. The amount of "figuring" necessary is reduced to a minimum that should not bother a mathematics-shy ham, because the method requires only the simplest arithmetical operations.

The process of designing from charts is facilitated by setting up the filters in half sections rather than full sections. The basic half section is shown at A in Fig. 17. The values of L and C are determined by the fact that at the chosen cut-off frequency their reactances are numerically equal and are also equal to the resistance of the load into which the filter is to work. (This resistance is usually designated by the letter R.) The cut-off frequency must of course be higher than the highest operating frequency, but should not exceed 50 Mc. for transmitters working in the 28-Mc. band and below. On the other hand, even though the 10-meter band is not used it is probably inadvisable to set the cut-off frequency lower than 20 Mc. This is because the larger coils required for low cut-off frequencies tend to show self-resonances in the v.h.f. region. Such resonances may have an adverse effect on the filter performance, principally in the 174–216 Mc. TV band but in some cases even in the 54–88 Mc. band. The factors that enter into the choice of a cut-off frequency were discussed in Part II of this article.

Since the filter is to be for coaxial line, we need consider only two values of R, 52 and 75 ohms, because these are the characteristic resistances of the coax cables in common use. Figs. 18 and 19 show, respectively, the basic L and C values for these two R values. The first step in designing a filter is to read the values from the figures; for example, if the cut-off frequency is to be 40 Mc. and 52-ohm coax is to be used, L will be 0.207 μh. and C will be 77 $\mu\mu$fd.

With L and C determined, a constant-k full T section is constructed as shown at B in Fig. 17.[18] This is done simply by connecting two half-sections back to back. Each coil therefore has the value of L found from Fig. 18. The two capacitances of the half-sections are usually, in practice, combined into a single condenser having twice the value given by Fig. 19, since they are connected in parallel in forming a full section.

The same L and C values are the basis for forming an m-derived half-section, but are modified as shown at C in Fig. 17. The value of the series inductance, L_1, is found by multiplying the L values from Fig. 18 by m. Similarly, the value of C_1 is found by multiplying the C value from Fig.

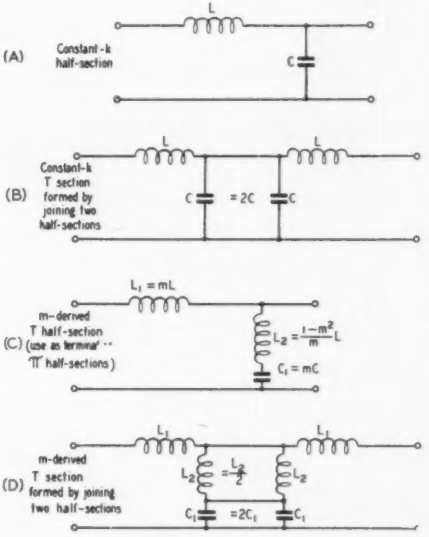


Fig. 17 — The half-section used as a basis for design is shown at A, while B shows how two half-sections are combined to form a full T section. The m-derived half-section (C) can be used as a terminating half-section in the form shown, or can be combined with another to form a full m-derived T section (D).

* Technical Editor, *QST*.

† Parts I and II of this article appeared in February and March *QST*, respectively.

[17] Seybold, "The Design of Low-Pass Filters," *QST*, December, 1949.

[18] The half-sections also can be used to construct full π sections, but the discussion here is limited to the T type because it is simpler from a constructional standpoint.

19 by m. The value of L_2 is found by multiplying L by a different factor, which is shown graphically in Fig. 20 for various values of m. Let us assume that m is to be 0.7, and use the values in the example above. Then from Fig. 20, $(1-m^2)/m$ is equal to 0.73. Therefore,

$$L_1 = mL = 0.7 \times 0.207 = 0.145 \ \mu\text{h}.$$

$$L_2 = \frac{(1-m^2)}{m} L = 0.73 \times 0.207 = 0.151 \ \mu\text{h}.$$

$$C_1 = mC = 0.7 \times 77 = 53.9 \ \mu\mu\text{fd}.$$

These values could be used just as they stand for terminating half-sections as described in Part II (Fig. 9 in March *QST*). However, if an m-derived full T section is to be formed, it is constructed by combining two half-sections back to back as shown in Fig. 17D. Each of the series coils has the same value as L_1. The two capacitances of the half-section again combine into one, with a capacitance equal to twice that of C_1 — 108 $\mu\mu$fd. in this example. The inductances, L_2, in the shunt arms also combine in parallel, so the resulting inductance is *half* the value obtained for L_2 above. The shunt-arm inductance for an m-derived full T section in the example therefore would be 0.075 μh.

That is about all there is to determining the proper constants for filters of the type considered, since the most elaborate arrangement desired can be formed from the basic sections discussed above.

Examples of Design

The complete design process can be made quite clear by following through a few examples. Let us assume that the problem is to design a filter that will be usable on all bands through 30 Mc., to work in 52-ohm coax. Since the lowest-frequency picture carrier is at 55.25 Mc. (Channel 2) the filter cut-off characteristic will have to be steep enough so that the attenuation will rise from zero at some frequency above 30 Mc. to a high value at 55 Mc. For reasons discussed in Part II, the cut-off frequency preferably should not be too close to 30 Mc. There is, in fact, no reason in this case why we should not use the type of design that is optimum for good impedance characteristics in the passband — that is, use m-derived terminating half-sections with $m = 0.6$. Since we want high attenuation at 55 Mc., the logical thing is to make that frequency the one at which the m-derived half-sections will have theoretically infinite attenuation.

From Fig. 13 (Part II) the ratio of the rejection frequency to the cut-off frequency is 1.25 when $m = 0.6$. This determines the cut-off frequency, which is

$$f_c = \frac{f_\infty}{1.25} = \frac{55}{1.25} = 44 \text{ Mc.}$$

Then the basic L-C values for 52-ohm line are 0.19 μh. (Fig. 18) and 70 $\mu\mu$fd. (Fig. 19).

For an m-derived half-section with $m = 0.6$, the

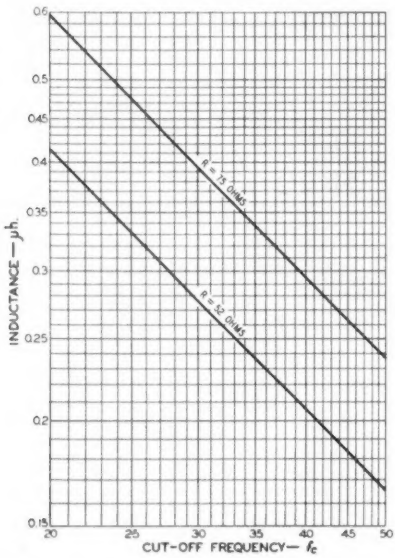


Fig. 18 — Inductance required in the half-section as a function of cut-off frequency and load resistance.

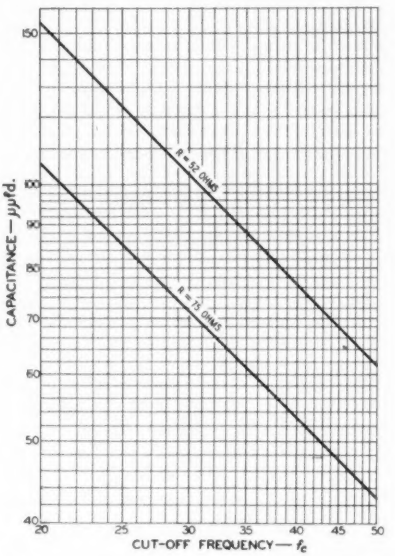


Fig. 19 — Capacitance required in the half-section as a function of cut-off frequency and load resistance.

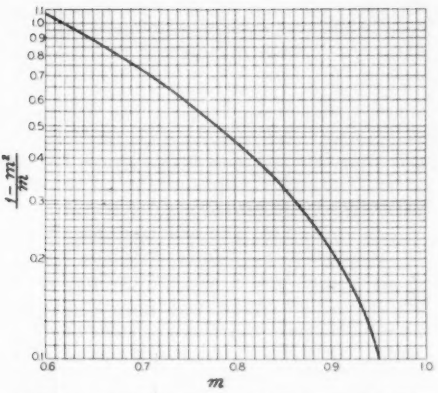


Fig. 20 — **Factor to apply to L and C in the basic half-section to determine the proper constants for an m-derived half-section.**

value of L_1 is

$$L_1 = mL = 0.6 \times 0.19 = 0.11\ \mu\text{h}.$$

and C_1 is

$$C_1 = mC = 0.6 \times 70 = 42\ \mu\mu\text{fd}.$$

From Fig. 20, $(1-m^2)/m$ for $m = 0.6$ is 1.07, so

$$L_2 = 1.07 \times 0.19 = 0.20\ \mu\text{h}.$$

In these and the following calculations the values have not been carried beyond two significant figures, for the reason that the actual inductances and capacitances cannot ordinarily be determined to a higher degree of accuracy.

The basic half-section, a constant-k full T section, and the m-derived half-sections ($m = 0.6$) are shown in the three top drawings of Fig. 21. Fig. 22 shows one way in which these circuits can be combined to form a simple type of filter. The individual sections are shown at the top and the practical circuit below. The graph shows the approximate theoretical attenuation for such a filter; this curve, and those following, were constructed from Fig. 12 as described in Part II. The attenuation throughout Channel 2 is 40 db. or better, and averages between 35 and 40 db. in Channels 3 through 6.

If greater harmonic suppression is required, one way to increase the attenuation is to add a second constant-k section. This arrangement is shown in Fig. 23, together with a graph of the approximate attenuation. The minimum attenuation in Channels 2 through 6 is now about 53 db. and the average is in the neighborhood of 56 db. Theoretically, the attenuation of this filter in the high group of TV channels will be greater than 84 db.

The filter of Fig. 23 requires four condensers, and it is of interest to see what might be done with a simpler circuit, when the thing of primary interest is high attenuation in particular channels. If, for example, we want particularly good harmonic suppression in Channels 2 and 4, an obvious step to take is to substitute an m-derived section for the constant-k section in Fig. 22. The frequency of maximum attenuation in this section can be placed at 70 Mc., the fifth harmonic of 14 Mc., since there will be no harmonics lower than 70 Mc. in this channel. Keeping the same cut-off frequency, the ratio

$$\frac{f_\infty}{f_o} = \frac{70}{44} = 1.59$$

and from Fig. 13 (Part II) this corresponds to $m = 0.78$. From Fig. 20, $(1-m^2)/m$ for $m = 0.78$ is 0.5. Consequently,

$$L_1 = 0.78 \times 0.19 = 0.15\ \mu\text{h}.$$
$$L_2 = 0.5 \times 0.19 = 0.095\ \mu\text{h}.$$
$$C_1 = 0.78 \times 70 = 54.5\ \mu\mu\text{fd}.$$

for the m-derived half-sections. The m-derived full T section is shown in Fig. 21. When this is

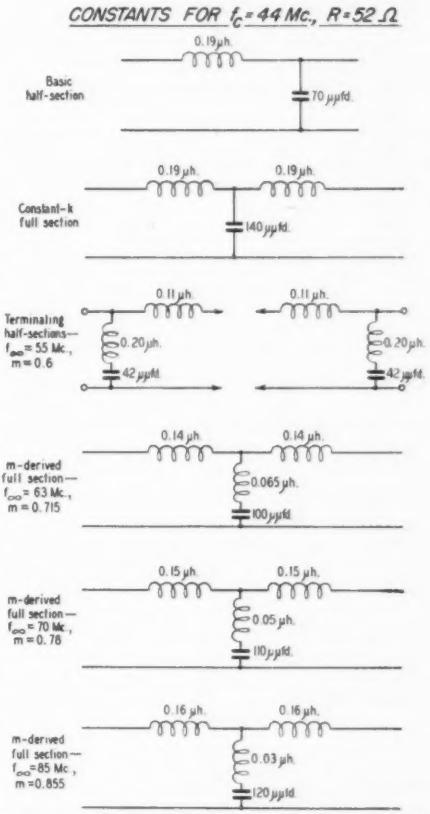


Fig. 21 — **Basic circuit constants for the examples of filter design worked out in the text.**

combined with the terminating half-sections as shown in the upper circuit of Fig. 24 the practical circuit shown in the same figure results. The attenuation in the part of Channel 4 in which harmonics fall averages better than 60 db. Comparing Fig. 24 with Fig. 22 shows that the attenuation in Channel 2 also has been increased, and is better than 50 db. throughout this channel. The price of these improvements is a reduction of attenuation in the channels above 174 Mc., a condition which may not be of very great practical importance.

Fig. 25 shows how a constant-k section can be added to the filter of Fig. 24 to make a further improvement in attenuation. The harmonic suppression is well above 60 db. throughout all the TV channels. The actual filter requires one extra condenser and one extra coil, as compared with Fig. 24.

In the case of the 3-6 channel combination, Channel 6 is of more present interest than Channel 3, because only harmonics from 7 Mc. and lower fall in the latter channel, while Channel 6 gets harmonics from all amateur bands from 30 Mc. down. Maintaining the same fundamental type of filter, and choosing 85 Mc. as the frequency of infinite attenuation, the frequency ratio is

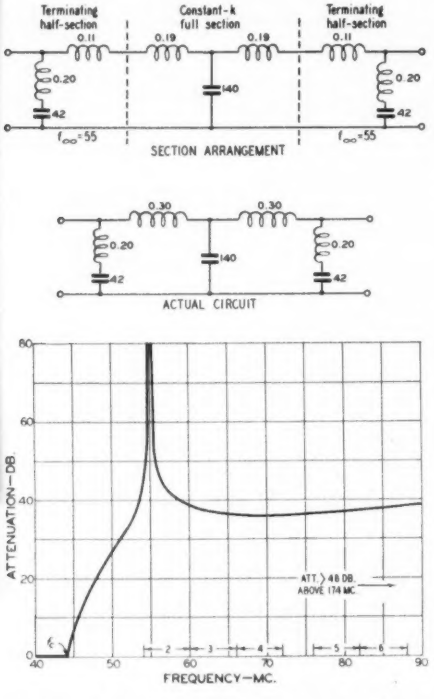
$$\frac{f_\infty}{f_c} = \frac{85}{44} = 1.93$$

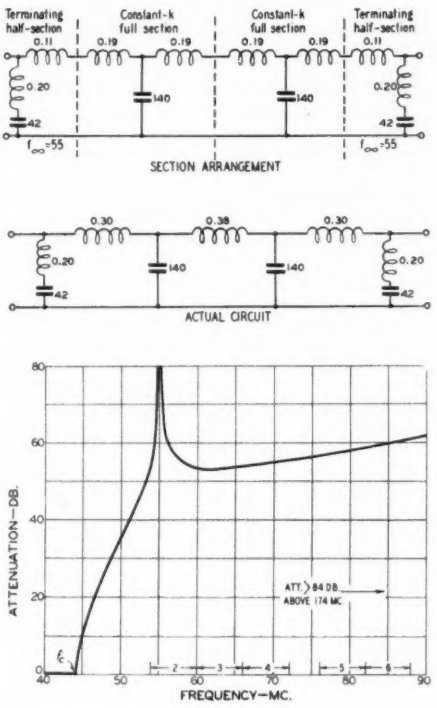
and from Fig. 13 $m = 0.855$. From Fig. 20 $(1-m^2)/m$ is 0.315. Consequently, for the basic half-section constants,

$$L_1 = 0.855 \times 0.19 = 0.16\ \mu\text{h}.$$
$$L_2 = 0.315 \times 0.19 = 0.06\ \mu\text{h}.$$
$$C_1 = 0.855 \times 70 = 60\ \mu\mu\text{fd}.$$

The full section is shown in Fig. 21. When combined with a pair of terminating half-sections the filter shown in Fig. 26 results. The attenuation is between 45 and 50 db. in Channels 2, 3 and 4, and better than 60 db. in the part of Channel 6 where harmonics fall. For those areas where Channel 6 is of most importance this filter could be just as effective, in practice, as the more elaborate arrangement of Fig. 25, although its over-all characteristics are not as good.

Eventually we shall have a 21-Mc. band and





Figs. 22 to 28, inclusive — Examples of filter design, with approximate theoretical attenuation. Numbers alongside coils give the inductance in μh., those alongside condensers are the capacitance in $\mu\mu$fd. The positions of TV Channels 2 to 6 are shown along the horizontal axis in the attenuation graphs.

Fig. 23

when that day comes Channel 3 will become a sore spot. Choosing 63 Mc. as the frequency of maximum rejection in Channel 3, we have

$$\frac{f_\infty}{f_e} = \frac{63}{44} = 1.43.$$

From Fig. 13 m is 0.715 and from Fig. 20 $(1-m^2)/m = 0.68$. Then

$$L_1 = 0.715 \times 0.19 = 0.14\ \mu\text{h.}$$
$$L_2 = 0.68 \times 0.19 = 0.13\ \mu\text{h.}$$
$$C_1 = 0.715 \times 70 = 50\ \mu\mu\text{fd.}$$

for the half-section. The full section is shown in Fig. 21. Adding such a section to the filter of Fig. 26 gives Fig. 27. The attenuation is above 70 db. in Channels 2 through 6 — a considerable improvement over Figs. 23 and 25, both of which also use four condensers. Although probably more than adequate, it is not as good as either Fig. 23 or 25 above 174 Mc.

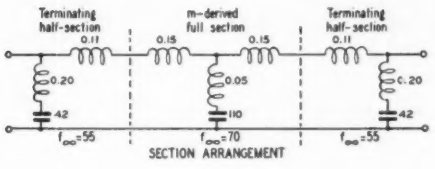
The process of building up filters from the basic constants has been carried through here in some detail simply to illustrate the method. It can be appreciated, after studying Figs. 22–27, inclusive, that the shape of the attenuation curve can be altered in practically any desired way by choice of cut-off frequency, frequencies of infinite attenuation, and number and types of sections. One last example illustrates to good advantage the effect of the cut-off frequency. Suppose that 28-Mc. operation is not a consideration, but that high attenuation is wanted in a simple filter for use with 52-ohm coax on bands below 14 Mc. In this case we can choose a low cut-off frequency and a large value of m. For reasons mentioned earlier, 20 Mc. is adopted as the cut-off frequency and m is taken as 0.95 so the rejection frequency will be near the center of the low group of TV channels. From Fig. 13 f_∞/f_e is 3.17 for $m = 0.95$, so

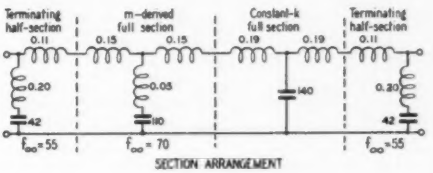
$$f_\infty = 3.17 \times 20 = 63.5\ \text{Mc.}$$

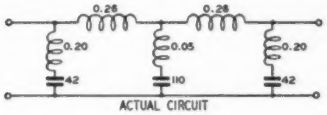
From Figs. 18 and 19, L and C are respectively 0.41 μh. and 155 $\mu\mu$fd. From Fig. 20, $(1-m^2)/m$ is 0.1 for $m = 0.95$. Hence,

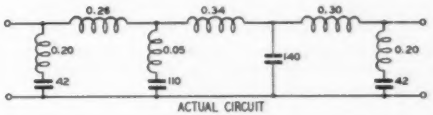
$$L_1 = 0.95 \times 0.41 = 0.39\ \mu\text{h.}$$
$$L_2 = 0.1 \times 0.41 = 0.04\ \mu\text{h.}$$
$$C_1 = 0.95 \times 155 = 147\ \mu\mu\text{fd.}$$

Since we are using a high value of m, there is no point in arranging terminating half-sections as is done in the case of $m = 0.6$; an m-derived full T section can be used, thus eliminating one condenser. The attenuation of such a section will be









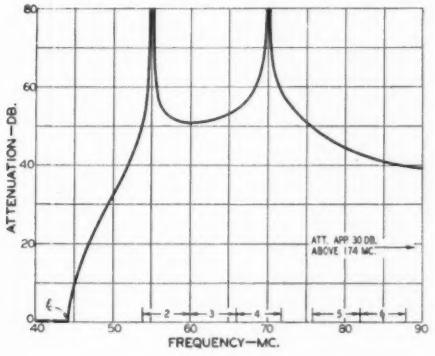


Fig. 24

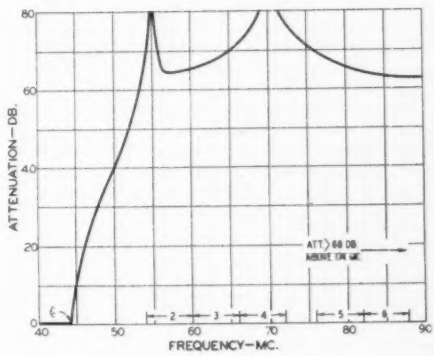


Fig. 25

as shown in Fig. 12 (Part II). Better attenuation can be secured by adding a constant-*k* section as shown in Fig. 28. Although it uses only two condensers, the performance of this filter is comparable with that of the four-condenser filter of Fig. 27, which speaks eloquently for the advantages of a low cut-off frequency.

The impedance characteristics of the simple filter of Fig. 28 are of some interest, since it does not follow the customary end-section design. Calculation shows that at 14 Mc. with a resistive load of 52 ohms the input impedance is so close to being 52 ohms of pure resistance that the mismatch is entirely negligible. The same thing would be true at any frequency below 14 Mc.

Filter Construction

The important points in filter construction have been covered recently in *QST* [17] and so do not need detailed attention here. They may be summarized as follows:

1) Use components having the lowest possible losses. The attenuation will be better, especially around the rejection points in *m*-derived sections, and the amount of fundamental power lost in the filter will be reduced.

2) Avoid any coupling between the various coils in the filter — and between the condensers, too, for that matter. Stray coupling can destroy the effectiveness of a filter. The cellular type of construction used by both W2RYI and W3NJE[19] is excellent in this respect, and is well worth the extra trouble in construction.

3) Keep the return (ground) paths of each section as independent as possible of all other sections. A small amount of coupling through the medium of ground leads or chassis is just as bad as stray inductive or capacitive coupling between filter elements. Cellular construction is an effective means for preventing return-circuit coupling.

4) Use good shielding about the filter as a whole. This is necessary to prevent transferring harmonics from the input circuit of the filter to the load by stray coupling. It also helps reduce coupling between filter elements themselves.

The inductances of filter coils fall, for the most part, in a range where there is likely to be considerable uncertainty in the calculation of coil dimensions. However, it is possible to standardize on wire size, coil diameter, and winding pitch,

[19] Pichitino, "A High-Attenuation Filter for Harmonic Suppression," *QST*, January, 1950.

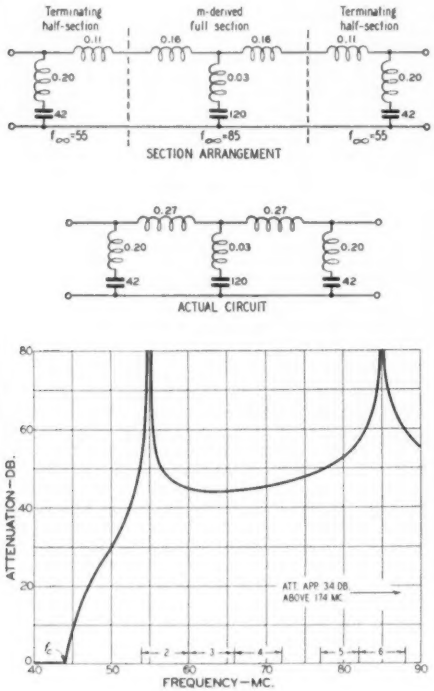


Fig. 26

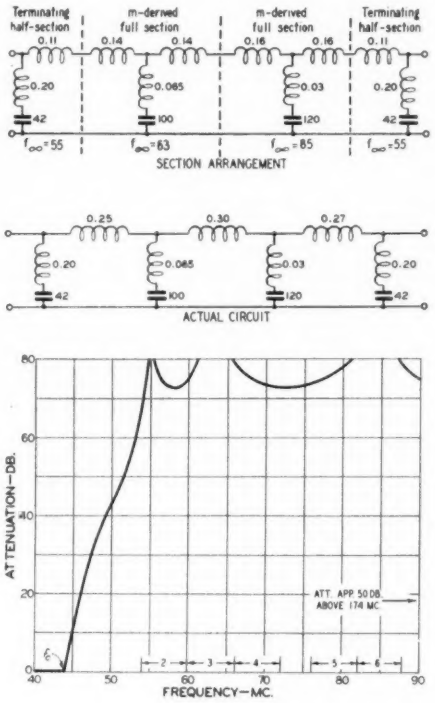


Fig. 27

because the range of frequency and characteristic impedance is not great. Fig. 29 shows measured values of inductance as a function of the number of turns, for coils of No. 12 wire, 8 turns per inch. The inductance values in each case include leads ½ inch in length. Since the accuracy of the curves is subject to measurement limitations, the information should be used principally as a guide. The coil inductance may be adjusted to the proper value, in the filter, by resonating the circuits as previously described.[17] No. 12 wire is large enough to handle a full kilowatt with no difficulty, provided the filter is working into a resistive or near-resistive load of the proper value.

Because the voltages across the condensers in a filter of the type discussed are low — providing the load is proper — variable condensers with receiver-type spacing are adequate for amateur powers. The best way to arrive at the proper capacitance is by measurement, but in the event that this is not possible the capacitance can be estimated to a fair degree of accuracy by the rotor setting. The maximum and minimum capacitance of the condenser must be known. The capacitance change in condensers with semicircular plates is directly proportional to the angular setting of the rotor over about 90 per cent of the range; the capacitance does not change much in the first 10 or 15 degrees of rotation at the minimum-capacitance end, and also tends to slow down near the 180-degree point (full capacitance). Making allowance for these features, it should be possible to estimate the capacitance within about 10 per cent at any given condenser setting.

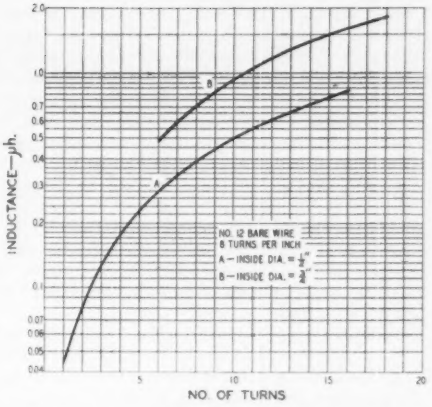


Fig. 29 — Measured inductance of coils wound with No. 12 bare wire, 8 turns to the inch. The values include half-inch leads. Where smaller inductance values are required, they should be obtained experimentally by adjusting to the proper resonance frequency with the specified capacitance. Coils of larger inductance can be wound from the common formulas.

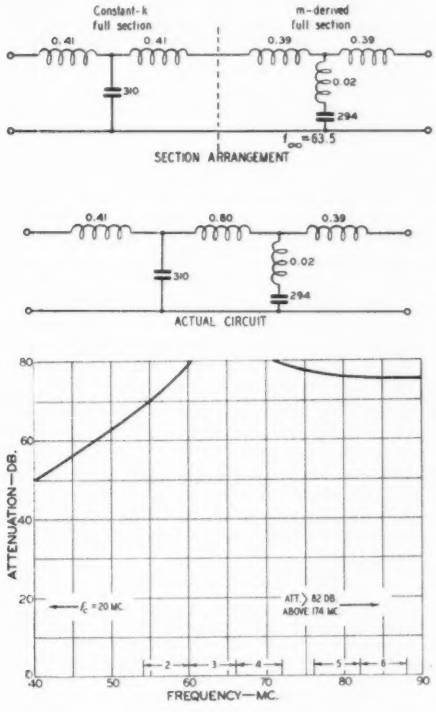


Fig. 28

Fixed condensers, which preferably should be of the ceramic type, can be purchased within specified tolerances. Condensers without tolerances specified should be carefully measured, if at all possible, because in the absence of any specification it has to be assumed that the capacitance may vary from the rated value by as much as plus or minus 20 per cent. Where the desired capacitances cannot be obtained in standard values there is no alternative but to combine enough units in parallel to add up to the correct capacitance.

The type of condenser used by Pichitino is probably ideal for filter construction because of its low inductance. As a guide for those who wish to make their own, Fig. 30 shows the calculated value of capacitance as a function of plate size, for both square and circular plates, for condensers having two plates separated by 0.01 inch. For other spacings, divide the capacitance shown (for the selected plate size) by the actual spacing in hundredths of an inch. For dielectrics other than air, multiply by the dielectric constant of the material used. For example, suppose a condenser is to be made using polyethylene sheet having a thickness of 0.012 inch, the desired capacitance

being 110 $\mu\mu$fd. The dielectric constant of polyethylene averages 2.35 (from the table in Chapter 25 of the *Handbook*) and so a condenser using it as a dielectric will have 2.35 times the capacitance of one having air dielectric. Since the thickness is 0.012 instead of 0.01, the capacitance will be reduced in the ratio 0.01/0.012 = 1/1.2. Hence the over-all factor to apply to Fig. 30 is 2.35/1.2 = 1.96; that is, the plate size will be given by Fig. 30 if the capacitance desired is divided by 1.96. In this case the desired capacitance is 110 $\mu\mu$fd., so the plate size will be given by the chart for 110/1.96 = 56 $\mu\mu$fd. Either square plates 1.6 inch on a side or circular plates having a diameter of 1.8 inch could be used.

The curves of Fig. 30 neglect "fringing," and so the actual capacitance of the condenser can be expected to be a little higher than calculated. Also, any open areas such as are necessary for mounting screws, etc., should be deducted from the plate area.

It is of course desirable that both coils and condensers should conform as closely as possible to the design values. It is important that the resonant frequencies of the shunt arms of *m*-derived sections be set as accurately as possible, particularly in the simpler filters in which dependence is placed on the infinite-attenuation points for high harmonic suppression. The resonant frequencies can be measured and set to the proper values by adjusting the coil inductance, condenser capacitance, or both.[20] In more elaborate filters this frequency adjustment is less critical, because exact placement of the rejection points is not depended on for optimum filter performance. In these cases, it will suffice to have the inductance and capacitance values within 10 per cent of the design values. This will introduce a maximum error of 5 per cent in the resonant frequencies, if both components are 10 per cent off in the same direction. If, as is readily possible, one is somewhat high and the other low, the errors tend to cancel each other.

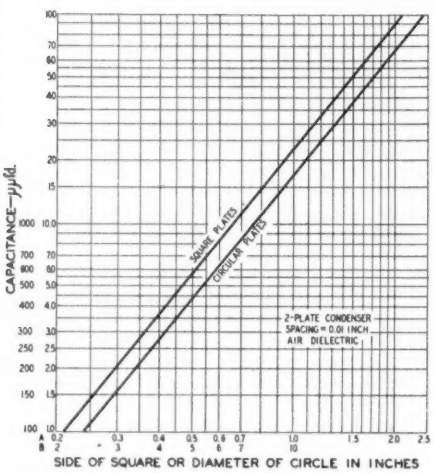


Fig. 30 — Capacitance of 2-plate condensers. For other plate spacings than 0.01 inch and for dielectrics other than air, the capacitance increases in direct proportion to the dielectric constant and in inverse proportion to the spacing.

In conclusion, a few words about measurements on filters will be pertinent. From the discussion of attenuation in Part II, it will be apparent to those who have attempted to make measurements at high radio frequencies that there is no practicable way of checking exactly the theoretical attenuation of a filter, since it requires matching the filter's image impedance at every frequency in the stop band. (Nor, as emphasized before, is there any guarantee that a filter having perfect theoretical performance will give the same attenuation in a practical installation — the probabilities are in the other direction.) In addition, there are many problems to be solved in a measurement set-up. Chief among these are the necessity for providing an input arrangement that will not introduce resonances of the type discussed in Part II, for reducing signal leakage to the point where it does not become a factor in measurements of 80 db. or more attenuation, and for providing a detector arrangement that will permit accurate measurement at extremely low signal levels.

In view of the many uncertainties, both fundamental and practical in nature, it is well to keep in mind that statements about measured filter attenuation mean something only when the full conditions and assumptions of measurement are known. And even then, there is no way to apply the figures directly to your own transmitter, transmission line and antenna. Such measurements as we have made indicate that actual filters, when built according to the constructional principles outlined, do have practical performance that is a good approximation to the theoretical. The attenuation does not become infinite, of course, at the theoretical "infinite-rejection" points, but it does run in the neighborhood of 70 db. with a single *m*-derived section terminated in a resistive load equal to the value of design impedance. Except for spurious resonance effects, the attenuation measurements at other frequencies usually will be found to be within a few decibels of the theoretical value under the same conditions.

[20] The grid-dip meter may be used for this purpose as described by W2RYI in December *QST*. In checking the series-resonant shunt arms of *m*-derived sections, it is important that a really low-inductance short circuit be used. Additional inductance in the "short" easily can shift the resonance point into the next TV channel, particularly where a high value of *m* calls for a very small series inductance.

Armed Forces Day Double-Header

Features Receiving Competition and QSO Party-Message Relay—Extra Credit for Use of Emergency Power

CIRCLE May 20th on your calendar . . . it's Armed Forces Day! The military is going all out this year to show its appreciation for, and its endorsement of, ham radio.

The day's double-header program will include a receiving competition patterned after the Navy Day copying contest so popular in years past and a QSO and message-relay contest open to all radio amateurs and emphasizing the traffic-handling aspects rather than mere contact and RST, QTH reports.

The Department of Defense is vitally interested in promoting the welfare of radio amateurs everywhere. And with reason. For, from the ranks of ham radio have come the operators, the technicians, the organizers and the administrators who may become military communications specialists in time of national emergency. The closer the liaison now, in peacetime, the more readily available is a large citizens reserve, when needed, to back up the professional military communicators.

Receiving Competition

A special greeting to amateurs from the secretary of defense, the Honorable Louis A. Johnson, will be broadcast over 13 military frequencies (five MARS and eight Navy) from Navy Radio Station NSS and Army Radio Station WAR, both in Washington, D. C., and from Navy Radio Station NPG at San Francisco, Calif., as follows:

Navy Radio Washington (NSS) will broadcast at 2100 EST (0200 GCT May 21st) and again at 2300 EST (0400 GCT May 21st) on 122, 4390, 9425, 12,630 and 17,000 kc.

Army Radio Washington (WAR) will broadcast at 2100 EST (0200 GCT May 21st) and again at 2300 EST (0400 GCT May 21st) on 3497.5, 6997.5, 14,405, 20,994 and 27,994 kc.

Navy Radio San Francisco (NPG) will broadcast at 2300 EST (0400 GCT) on 115, 9255 and 12,540 kc.

Transmissions are scheduled to start on the hour. If a slight delay occurs, this will not indicate that you are tuned to the wrong frequency, but rather that the operator is shifting tapes in the automatics. All transmissions will be at 25 w.p.m. A five-minute CQ will precede the actual message from Secretary Johnson.

The Armed Forces will issue a Certificate of Merit, suitable for framing and display, to anyone who copies the message without error. Send your copy to Armed Forces Day Contest, Room 5 B 519, The Pentagon, Washington 25, D. C., postmarked before midnight May 30, 1950. Be sure to include your complete name, station call, mailing address, and the time you copied the message.

Armed Forces Day QSO Party
May 20, 1950

Time	*Starts*	*Ends*
PST	0900	2100
MST	1000	2200
CST	1100	2300
EST	1200	2400
GCT	1700	0500 (May 21)

SAMPLE LOG
ARMED FORCES DAY QSO PARTY
LOG OF STATION W5XYZ

FREQ. BAND (MC)	PHONE OR C.W.	LOCAL TIME	STATION WORKED	MESSAGES HANDLED	POWER (COM'L OR EMERG)	POINTS
14 Mc	Phone	1321	W1SZ	Orig Nr 7	Com'l	11
"	"	1326	KL7BC	-	"	1
7 Mc	C.W.	1403	W7COH	-	Emerg	2
"	"	1411	W4KFC	Rcd Nr 14	"	6
"	"	1413	W9GBJ	-	"	2
3.5 Mc	"	1728	W9BRD	-	Com'l	1
"	"	1735	K9NRA	Rcd 8, Sent 14	"	5
"	"	1737	W4KFC*	Rcd Nr 63	"	2
28 Mc	Phone	1840	K6USA	Sent Nr 8	"	3
"	"	1852	W3AMP	-	"	1
"	"	1909	W2YLE	-	"	1

*Station worked a second time; credit for message only.

FINAL SCORE: 36

Summary: Bands used - 3.5 Mc c.w.; 7 Mc c.w.; 14 Mc phone; 28 Mc phone.

Different Stations Worked - 10

Number and calls of operators: One (1) - W5XYZ

Signature: Joe Doe, W5XYZ
Address: 22 Contact Street
Hamlon, Texas

QSO Party

The QSO-Relay Contest will have for its main purpose the demonstration on a national scale of the effectiveness of point-to-point or person-to-person communication by amateur radio as a back-up system for normal communications systems which might be knocked out at any time by flood, fire, storm, ice, or sabotage.

Because the great need in most disasters is for

(*Continued on page 106*)

Results—Ten-Meter WAS Contest

BY L. G. McCOY,* W1ICP

TEN METERS reverberated from one end to the other with stations calling "CQ WAS Contest" during the Ten-Meter WAS Contest held January 7th, 8th, 14th and 15th. Even though conditions were mediocre for a good part of the contest time, competition was keen and some excellent scores were chalked up. It proved to be a swell opportunity for many amateurs to get those "hard-to-get" states on 28 Mc. Comments from the field indicated wholehearted enthusiasm and told of the enjoyment that the gang received by taking part in the contest. The typical comment was that the fellows liked the simplicity of scoring and ease of operation offered under the rules. No one station managed to work all states although some of the contestants came within a whisker of getting a perfect score. It was interesting to note that regardless of location in the country, the ten-meter gang was able to turn in some very impressive totals of states worked. It had seemed that at the beginning of the contest some districts would have a slight edge over others but the final results did not bear out these conclusions.

There were 256 logs submitted, representing 61 sections. The highest score received was that of W1ATE, Chad Knowlton. Using both 'phone and c.w., Chad ran up the amazing score of 17,501 points with a total of 407 contacts and 43 states worked, missing only Georgia, Delaware, West Virginia, South Carolina, and Kentucky. KH6IJ, Katashi Nose, an old contest stand-by, was a close runner-up for top honors, scoring 16,450 points, 350 contacts and 47 states, missing Maine for a par 48. W9BVX, Ken Slane, placed third with a nice score of 12,250 points, 350 contacts and 35 states. Other high scores were W6APG 12,062, W7LEV 11,448, W1BFT 10,222, W1RIL 10,027, W8WZ 9922, W4DHZ 9906, WØIPC 9480, W6VPV 9361, W6GDO 9250, and W3OCU 9048.

* Asst. Communications Manager, 'Phone.

Stations working large totals of states were KH6IJ 47, W1ATE 43, W8WZ 41, W7JDX 40, W3OCU 39, W3JTK 39, W4DHZ 39, W4FNQ 39, W8CVU 39, W1BFT 38, W1CJH 38, W1RIL 37, W6APG 37, W6GDO 37, W6VPV 37, W6HGA 36, W6ZXD 36, W7LEV 36, W7KIO 36, W9NII 36, W6CUB 35, and W9BVX 35.

Comments

"Enjoyed the contest very much, already have received some of those needed QSL cards." — *W6CUB.* "Didn't think my c.w. was up to contest form, but after receiving encouragement from W8CVU, I really enjoyed myself . . . been a fone hound for 12 years." — *VE7WL.* "Best contest I've been in for a long time, no strings, no complications . . . no power limit, no time restrictions, a general free-for-all, every man for himself!" — *W1BFT.* "Thanks for the chance to get some of the hard states on 28 Mc. . . . During contest worked four that I needed, hope they QSL." — *W8AL.* "Sure liked the contest, hope they have another next year." — *W8DED.* "Lost one-half hour's contest time getting FCC inspector's car out of mud from in front of my house. Do I get a special multiplier?" — *KP4JE.* "It was a tough battle and I lost valuable time due to a blizzard here. I probably lost many contacts in states already worked by seeking unworked states too much . . . anyhow it was fun and I hope future WAS contests will follow." — *W7JDX.* "This ten-meter WAS contest was one of the first that I have attempted to work in a rather serious vein, and the surprising part for me was that I had a lot of fun and thoroughly enjoyed it . . . much to my surprise." — *W5FI.* "I broke my wrist and tore the ligaments in my foot just prior to the contest . . . too busy to worry about my ailments what with pulling switches, tuning receiver and keeping log with one hand." — *WØBBS.* "If your aim was to stir some action on 10, you succeeded. . . . This

Ken Slane, W9BVX, winner in the Wisconsin Section and third in the country. Ken runs 1 kw. to a 4-element quarter-wave-spaced beam. His receiver is a homebuilt 17-tube double-conversion job.

WØIPC, Allen B. Benson, 30 states and 316 contacts, was winner in the North Dakota Section with a score of 9480. Al's got a grip on that mike like he really means business.

♦

clambake gave ten c.w. a shot in the arm that it sure needed . . . seems more than one such contest a year is needed . . . Thanks for the invite . . . it was fun . . . let's do it again soon!" — *KH6RU/ex-W5GNV.*

(Scores are grouped by Divisions and Sections. . . . The operator of the station first-listed in each Section is winner for that Section. . . . Listings show score, number of contacts, number of states worked.)

ATLANTIC DIVISION

Eastern Pennsylvania

W3OCU	9048-232-39
W3NTD	5661-153-37

Maryland

W3JTK	7020-180-39
W3OWN	2006-118-17
W3BKK	1716- 78-22
W3IZL	765- 45-17
W3OVP	432- 27-16
W3OSF	136- 17- 8

Southern New Jersey

W2QKJ	2600-100-26

Western New York

W2PVG	2254- 98-23
W2ZJ	1501- 79-19
W2RQF	882- 49-18
W2AQF	280- 20-14
W2WZQ	220- 20-11
W2ZLL	4- 2- 2

Western Pennsylvania

W3KNQ	276- 23-12
W3GJY	207- 23- 9
W3ODU	144- 18- 8

CENTRAL DIVISION

Illinois

W9NH	5472-152-36
W9ANO	1632-136-12
W9NJZ	390- 39-10
W9JNC	168- 24- 7

Indiana

W9SRF	600- 50-12
W9UEM	320- 32-10

Wisconsin

W9BVX	12,250-350-35
W9RQM	6912-256-27
W9AQD	5513-149-37
W9CTD	2502-139-18
W9KXK	1740-116-15
W9JBF	1705-155-11
W9VHA	1620-135-12
W9BQM	1491- 71-21
W9FXA	880- 80-11
W9EWM	744- 62-12
W9FYP	690- 69-10
W9HEE	684- 57-12
W9HBC	464- 38-13
W9HDZ	65- 13- 5

DAKOTA DIVISION

North Dakota

WØIPC	9480-316-30
WØNBS	6328-226-28
WØFNZ	4300-172-25
WØVLC	828- 46-18
WØKOY	820- 41-20
WØLHS	198- 22- 9
WØCAQ	198- 18-11

South Dakota

WØIWE	6509-283-23
WØGFG	1800-100-18

Minnesota

WØMLT	2541-121-21
WØKSI	2448-136-18
WØSOY	918- 54-17
WØMDF	481- 37-13
WØSZC	200- 29-10
WØTKX	35- 7- 5

DELTA DIVISION

Arkansas

W5DYL	976- 61-16

Louisiana

W5KC	7130-230-31
W5PXW	1656- 92-18

Tennessee

W4JD	4026-122-33
W4LNF	2295- 85-27

GREAT LAKES DIVISION

Michigan

W8CVU	3783- 97-39
W8DLS	840- 70-12
W8OCA	640- 40-16
W8DED	615- 41-15
W8FLA	378- 27-14
W8COF	279- 31- 9

Ohio

W8WZ	9922-242-41
W8AJW	7917-273-29
W8JFC	2580- 86-30
W8EDP	1248-104-12
W8BCQ	696- 58-12
W8AL	630- 45-14
W8WSE	360- 30-10
W8BUM	221- 17-13

HUDSON DIVISION

Eastern New York

W2ZPO	2079- 99-21
W2TWU	560- 40-14

New York City and Long Island

W2GTL	3264-102-32
W2DSC	2553-111-23
W2DBI	865- 45-19
W2NNB	435- 29-15
W2WC	528- 33-16
W2TUF	364- 28-13
W2NNH	65- 13- 5
W2KZE	16- 4- 4

Northern New Jersey

W2DJT	2210- 85-26
W2EQS	2080- 80-26
W2KHT	1408- 64-22
W2NIY	16- 4- 4

MIDWEST DIVISION

Iowa

WØFGW	1500- 75-20
WØSQN	750- 75-10

Kansas

WØHOM	7099-229-31
WØOYX	3672-136-27
WØAWP	2328- 97-24
WØIPI	1462- 86-17
WØOZA	1088- 64-17
WØAAO	264- 24-11

Missouri

WØYHD	4212-160-26
WØARH	1577- 83-19
WØJAH	944- 59-16
WØTFQ	738- 41-18
WØWCM	500- 50-10
WØMCX	152- 19- 8

Nebraska

WØBBS	4784-208-23
WØAYO	2088-116-18

NEW ENGLAND DIVISION

Connecticut

W1ATE	17,501-407-43
W1HDQ	5134-130-21
W1MRP	4160-130-32
W1FTX	2475- 75-33
W1ON	2150- 86-25

(Continued on page 108)

♦

Washington Section winner, W7LEV, Herman J. Paas, jr., ran up a score of 11,448 for 2nd high on the West Coast. Using both 'phone and c.w., Herman garnered 318 contacts and 37 states.

Key Clicks and Receiver Bandwidths

How To Adjust Your Transmitter Keying

BY BYRON GOODMAN,* W1DX

If and when you sharpen your receiver, by adding a Q5-er or even by learning how to use a crystal filter, two things immediately become apparent. First off you find "holes" in the c.w. bands where you used to find signals. The better the "skirt" selectivity, the more marked is the effect. It's no real surprise, however, because it is the end result that prompted your getting more selectivity from the receiver. The second effect is somewhat unexpected: If there is much activity, the "holes" are filled with clicks! With mediocre selectivity you only noticed the really bad clicks, because the overlapping signals masked the others, but a sharp receiver shows up many more in a hurry. The better the selectivity, the more apparent becomes the rather poor quality of the average keying, and anything better than a Q5-er (such as the "super-selective" type of i.f. amplifier) will make you wonder about the present "state of the art."

"So what?" you ask. "The FCC has never called me on my clicks — *my* transmitter is clean." Oh, sure. Didn't the one or two fellows you asked about your keying when you first put the rig on the air say your keying was fine? (And haven't you overlooked clicks when *you* were asked about them?) The whole point is that you don't really know about your clicks unless *you* yourself have listened quite critically to your own signal. Don't worry, we'll tell you how to do it and what to look for a little later.

Why all this fuss about clicks? If they aren't bad enough to attract the immediate attention of the FCC monitoring stations or the OOs, why worry? Actually, of course, you don't have to if you don't want to. You will probably be able to work about as many stations as you could with a good signal — it's mainly a matter of pride. Your signal, your fist, and your operating are the things that build your reputation on the air, and a good signal coming from a haywire station will do more for you than a clicky one from a picture-book job. (The fist and operating aren't under discussion here.) If you have no pride in your signal, you can stop reading right here — we can do nothing for you.

But what's this about receiver bandwidths and keying — how do they tie together? Simply this: The tendency in c.w. work is toward more and more selectivity in our receivers. If you don't believe it, try to buy a Q5-er from a c.w. operator who knows how to use it. Even the receiver manufacturers, after a number of years of ignoring the thing, except for including crystal filters in their receivers, are coming around to looking closely at the possibility of including better skirt selectivity in some of their new models. What real selectivity can do has been ably demonstrated by hardy pioneers like W9AEH [1] and a few others, although this extreme will probably find its way into the shacks of only a few for many years to come. But with this more useful selectivity comes better utilization of our bands, *only if we clean up our transmitters!* Those clicks outside the passband of the receiver tuned to the signal do nothing but interfere with adjacent signals — they contribute nothing to readability.

And there are your two reasons for eliminating useless key clicks: The very real one of personal pride, and the less tangible one of being a good neighbor.

We deliberately said "useless key clicks" for a very good reason. Experience has shown that a very slight click or thump is desirable on the "make" of a signal, with little or none on the "break," for the most pleasant and accurate copy. If the keying is too soft on "make," it becomes difficult to copy at high speeds, and the most confusing signal of all is one that is soft on "make" and clicky on "break." But you can have all the thump on "make" that you need and still not have the effects extend beyond the passband of a selective receiver.

Checking for Key Clicks

The easiest way to find out what your signal sounds like on the air is to trade stations with a near-by ham friend some evening for a short QSO. If he is a half mile or so away, that's fine, but any distance up to the point where the signals are still S9 will be satisfactory.

After you have found out how to work his rig (yours is *much* more convenient, of course), make contact and then have him send slow dashes, with dash spacing. (The letter "T" at about 5 w.p.m.) With the crystal filter out, cut the r.f. gain back just enough to avoid receiver overloading (the condition where you get crisp signals instead of mushy ones) and tune slowly from out of beat-note range on one side of the signal through to zero and out the other side. Knowing the tempo of the dashes, you can readily

* Assistant Technical Editor, *QST*.

[1] Githens, "The Super-Selective C.W. Receiver," *QST*, Aug., 1948.

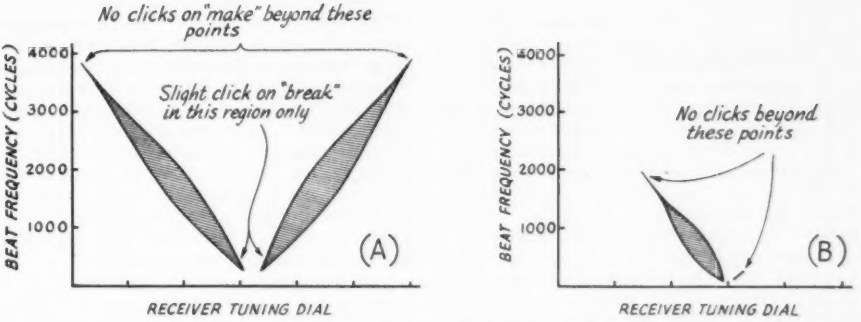


Fig. 1 — Representations of a clean c.w. signal as a receiver is tuned through it. (A) shows a receiver with no crystal filter and the b.f.o. set in the center of the passband, and (B) shows the crystal filter in and the receiver adjusted for single-signal reception. The variation in thickness of the lines represents the relative signal intensity. The audio frequency where the signal disappears will depend upon the receiver selectivity characteristic and the strength of the signal.

identify any clicks in the vicinity as yours or someone else's. A good signal will have a thump on "make" that is perceptible only where you can also hear the beat note, and the click on "break" should be practically negligible at any point. Fig. 1A shows how it should sound. If your signal is like that, it will sound good (provided there are no chirps) and your chest expansion will go up a few inches. Then have him run off a string of 35- or 40-w.p.m. dots with the bug — if they are easy to copy, your signal has no "tails" worth worrying about and is a good one for any speed up to the limit of manual keying. If the receiver has poor selectivity with the crystal filter out, make one last check with the filter in (Fig. 1B), to see that the clicks off the signal are negligible even at high signal level.

Checking at Home

But suppose you don't have any convenient friends with whom to trade stations, what then? You can still check your keying, although you have to be a little more careful. The first step is to get rid of the r.f. click at the key, because if you don't you will never know where you stand. Locally (meaning in your own receiver) this click will coincide in time with clicks that may or may not be on your signal, so there is just no way to observe your signal without first eliminating the r.f. click. And unless you have a telepathic keying system that breaks no current, you have a click at the key! Even the current broken by the key in a vacuum-tube keyer circuit (which is sometimes only 0.1 ma. or so) will cause r.f. clicks that can be heard in your receiver and often in the b.c. set. If you key with a relay, the key opens the relay-coil circuit and clicks are generated at the key as well as at the relay contacts. Don't make the very common mistake of thinking these clicks are the same as the on-the-air clicks discussed earlier — they are not! They are simply local clicks that you must eliminate before you can observe your signal in your receiver. These clicks are the same as the ones you get when you turn an electric light on or off — when you suddenly start or stop current flow, no matter how little, you generate r.f. and that's the click.

Getting rid of this little click is generally no trick at all, unless you're breaking a lot of current. All it requires is a small r.f. filter, as shown in Fig. 2. Sometimes just a small (0.001-μfd.) condenser mounted right at the key terminals will do it, and sometimes it will require the full treatment complete with r.f. chokes and second condenser. Measure the normal current through the key leads, remove the transmitter leads, and then connect a d.c. power supply and resistor to give the same current through the key. When your key will break this current with no click, as observed in your receiver and the b.c. set (tuned off any station), you have a suitable r.f. filter at the key and you can reconnect the transmitter. If you use a vacuum-tube keyer, just don't turn on the transmitter but key the normal keyer grid current. If you use a keying relay, first eliminate the click at the key by just keying the relay and adding filter across the key, and then

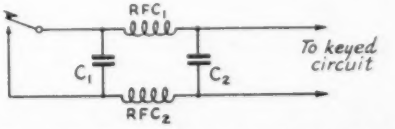


Fig. 2 — A filter for eliminating the r.f. click at the key. First try C_1, then add the two r.f. chokes, and then C_2. This filter does not eliminate on-the-air clicks, but it is necessary if you are trying to check keying in your own receiver. It should be mounted right at the key.

C_1, C_2 — 0.01 to 0.001 μfd., not critical.
RFC_1, RFC_2 — 1- to 2.5-mh. r.f. choke.

eliminate the click at the relay contacts with another r.f. filter in the relay-keyed circuit. The filter should be mounted right at the key or relay contacts. The objective is to be able to make or break normal key current without generating a local click, and the filtering is usually so simple that the junk box will yield the parts and the process takes longer to describe than to apply.

So far you haven't done a thing for your signal on the air and you still don't know what it sounds like, but you may have cleaned up some clicks in the b.c. set. Now disconnect the antenna from your receiver and short the antenna terminals with a short piece of wire. Tune in your own signal and reduce the r.f. gain to the point where your receiver doesn't overload. Detune any antenna trimmer the receiver may have. If you can't avoid overload within the r.f. gain-control range, pull out the r.f. amplifier tube and try again. If you still can't avoid overload, listen to the second harmonic as a last resort. Since an overloaded receiver can generate clicks, it is easy to realize the importance of eliminating overload during any tests or observations.

Describing the volume level at which you should set your receiver for these "shack" tests is a little difficult. The r.f. filter should be effective with the receiver running wide open and with an antenna connected. When you turn on the transmitter and take the other steps mentioned to reduce the signal in the receiver, run the audio up and the r.f. down to the point where you can just hear a little "rushing" sound with the b.f.o. off and the receiver tuned to the signal. This is with the crystal filter in. At this level, a properly-adjusted keying circuit will show no clicks off the rushing-sound range. With the b.f.o. on and the same gain setting, there should be no clicks outside the beat-note range. When observing clicks, make the slow-dash and fast-dot tests outlined previously.

Now you know how your signal sounds on the air, with one exception. If keying your transmitter makes the house lights blink or the dial light in your receiver flicker, you may not be able to tell too accurately about any chirp on your signal. However, if you are satisfied with the absence of chirp when tuning *either side of zero beat*, it is safe to assume that your receiver isn't chirping with the light flicker and the observed signal is a true representation. No chirp either side of zero beat is fine — some chirp can be either in your transmitter or your receiver, when the lights flicker. But don't try to make these tests without first getting rid of the r.f. click at the key — you will never be able to give yourself a clean bill of health, because clicks can mask a chirp.

In some instances, particularly if the transmitter power is several hundred watts or more, you may find that a small click still persists on all frequencies. If such a click is observed, pull out the last i.f. amplifier tube in your receiver and listen again. If the click is still there, it indicates rectification in the audio system of your receiver, the same type of BCI we cuss out cheap midget receivers for. You can cure it with the usual resistor-condenser filter used for curing such BCI cases, or you can leave it in and make mental compensation for it. Any click you hear on your signal should reduce to this minimum click immediately off the signal.

Another unavoidable click can be encountered by r.f. pick-up on the lead from a receiver i.f. amplifier to a Q5-er. Here again the click will be present at any setting of the receiver tuning control. The solution here is to make your checks with the Q5-er disconnected and the lead removed from the receiver.

Contact Bounce

You may find that making the slow dashes with the dash side of your bug key, or even making dots with the dash lever, gives a clean signal, but that clicks come in when the dot lever is held over. No, the rig isn't hexed. You have "bounce" or "scratch" at the dot contact on your bug — you can also have bounce in a keying relay that isn't suitable — and it is not always an easy thing to cure. It is present on a number of signals on the bands, if you know what to look for, and you can pick it out by noticing a difference in the keying characteristic between the dash side and the dot side of the key. There is no sure cure, but you can start by cleaning the dot contacts and reducing the throw of the dot lever. Another tack is to increase the damping of the spring arm that supports the movable dot contact — some operators use a cigarette stub or piece of sponge rubber jammed in the curve of the spring. If we knew a sure cure we would be happy to pass it along, but we haven't found one — you just have to experiment.

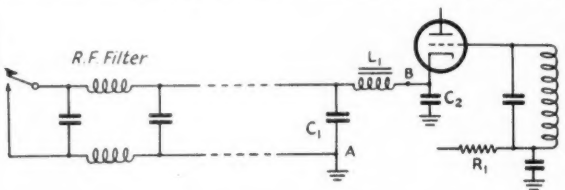


Fig. 3 — A key-click filter for cathode or negative-lead keying. It can be located anywhere in the keying line. The values of L_1 and C_1 will vary widely with different currents and voltages, and must be found by cut-and-try.

C_1 — 0.05 to 2.0 μfd.
C_2 — R.f. by-pass condenser at cathode.
R_1 — Normal grid leak. Returns to *A* for cathode keying, to *B* for negative-lead keying.
L_1 — 0.5 to 30 henrys.

Curing Clicks

What to do about clicks if you have them? Well, clicks are caused by the key turning your transmitter on and off too fast — and sometimes by parasitic oscillations in an amplifier — and all a key-click filter does is to slow down the turning-on and turning-off processes. Parasitic clicks occur at points 25 to 100 kc. either side of the signal, and are caused by low-frequency parasitic oscillations that are triggered by the keying. The cure consists of eliminating the oscillation, not adding key-click filters. Now let's look at a few typical keying circuits, and how to adjust key-click filters.

One of the most popular circuits for keying is the cathode — the "center tap" with filament-type tubes — and its first cousin, the negative-supply lead. In an amplifier either type of keying responds to the same treatment, the lag circuit or keying filter shown in Fig. 3. If an oscillator is keyed, the following statements apply only to negative keying, because the grid-circuit time constant complicates the picture in cathode keying of an oscillator. If the grid is returned to ground in Fig. 3 the circuit is called "cathode keying" — if the grid is returned to the cathode it becomes "negative-supply keying."

Adjustment of the filter in Fig. 3 is simple. If your signal has too heavy a click or thump on "make," L_1 should have more inductance. If the click is too heavy on "break," C_1 should have more capacity. The "break" characteristic is also influenced by the value of L_1, so start with a value of C_1 that reduces the clicks noticeably on "break," adjust the value of L_1 for best "make" characteristic, and then clean up the "break" by further modification of C_1. Since you may have only a few stray inductances around the shack, you may not find just the value you want for L_1. In this case, use a value that gives too soft a "make" and then shunt the inductance with resistance to reduce its effect. Transformer windings will often serve as well as standard chokes in this application, so try everything around the shack until you find what you need. For a given voltage, high-current circuits will require more C_1 and less L_1 than will low-current ones.

Another common circuit is the tube keyer circuit and its half-brother, grid-block keying (Fig. 4). Adjustment of these is simple, too. For a given value of C_1, increasing the value of R_1 will soften the "make" characteristic, and increasing the value of R_2 will soften the "break." The value of R_2 will be many times the value of R_1. With grid-block keying, the value of R_1 is determined already if the tube runs grid current, because this will be the normal grid leak, and so the value of C_1 must be adjusted for proper "make" characteristic and then the "break" made satisfactory by adjustment of R_2. Tubes running heavy grid current are not too suitable for grid-block keying because the value of R_2 generally ends up comparatively low and the negative supply must furnish too much current when the key is down.

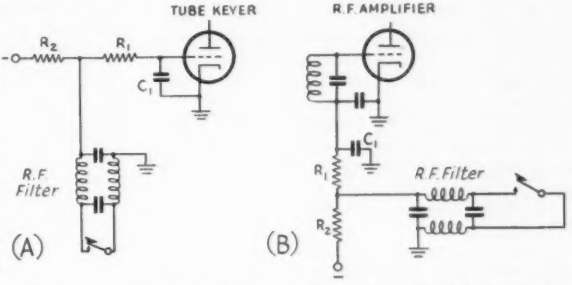


Fig. 4 — Vacuum-tube keying circuits (A) and grid-block keying circuits (B) are essentially the same, and they respond to the same treatment. See text for adjustment procedure.

And now for a couple of parting thoughts. If you are keying in a low-level stage, don't overlook the clipping action of subsequent stages that are fixed-biased beyond cut-off. It can reintroduce clicks. Dig out W9ADN's article [2] and read it again. And if you key your oscillator, don't be too disappointed in the chirp that shows up when you have clickless keying. Amplifier keying is the answer.

And don't get the idea that the kind of keying we have been talking about will be too "soft" for what you want. Once you get the hang of adjusting your keying to where it has no clicks off the beat-note range, even with an S9 signal, you will find that the signal is still very solid. It may even sound slightly clicky within the receiver passband, but it will be clean outside. It will be the type of signal that attracts attention because it is so rare these days.

[2] Carter, "Reducing Key Clicks," *QST*, March, 1949.

Strays

An interestingly-written 48-page booklet on the history, manufacture, types and uses of files is available without charge from the Nicholson File Co., Providence, R. I. Entitled *File Filosophy*, the booklet is packed with metal-working kinks that will come in handy in the ham workshop.

— *W6PGH*

—···—

W6MU's laundryman is Y. C. Que . . . !

Happenings of the Month

WRITE YOUR DIRECTOR

"The affairs of the League shall be managed by a Board of Directors . . . (from each division a director shall be) elected by the Full Members of the League . . . the Board of Directors shall meet in annual session for the conduct of League business in the month of May of each year . . . the directors shall keep themselves informed on conditions and activities in their respective divisions, and on the needs and desires of the League members therein, that they may faithfully and intelligently represent them in the Board of Directors. . . ."

These excerpts from the ARRL Constitution & By-Laws become particularly important to members as we approach the time of the annual meeting of the ARRL Board. Throughout the year directors visit clubs and conventions, send out bulletins and questionnaires, engage in correspondence and over-the-air contacts or use other means to determine amateur sentiment in their respective divisions concerning problems of the day. From now until May your director will be particularly anxious to hear from you and your club. If you have a specific position on various amateur issues, or if you have ideas for the improvement of the handling of League affairs or of amateur radio itself, sit down *now* and drop a line to your director, address on page 8. He wants to hear from you. *You* are the League, but only to the extent that you exercise the right of making your wishes known.

EXTRAORDINARY ADMINISTRATIVE CONFERENCE

The Provisional Frequency Board (in session since early 1948 in Geneva, Switzerland, to set up a new world-wide station list primarily for the fixed service) now having completed major portions of its task, it has been decided to call an Extraordinary Administrative Conference in Geneva starting September 1st. It is expected that most nations of the world will send delegations; the principal purpose of the conference is to implement the new station list. Preparatory committees to establish the plans and policies for U. S. participation are currently meeting in Washington, with Secretary Budlong in attendance as often as seems desirable. More on this as it develops.

PRESIDENTIAL POLICY BOARD

On February 17th President Truman set up a "President's Communications Policy Board" to make an over-all study of the U. S. frequency uses and communications policies. What specific studies the board will make will not be known until it has begun its meetings, probably sometime in March; it is now "setting up shop" in Washington. Meanwhile, we note several good friends of amateur radio among the membership, which is: Dr. Irving L. Stewart, former FCC commissioner; Dr. Lee DuBridge, president of Cal. Tech.; James R. Killian, president of M.I.T.; Prof. William L. Everitt, dean of the E. E. department, U. of Ill.; and David H. O'Brien, former assistant administrator of the War Assets Administration.

THE "BRAILLE TECHNICAL PRESS"

A long-felt need for the blind amateur or would-be amateur appears well on its way to fulfillment with the publication of the first issue of *The Braille Technical Press*. Started by W2JIO, himself an instructor for the blind, the new publication sells for less than publication cost — 50 cents per issue, including postage. Aimed at the amateur, serviceman and sound technician, the publication's scope can be measured by scanning the title page of the first issue — passing the radio examinations, sound recording and reproduction, test equipment, auditory milliammeters, harmonic suppression, a simple amateur transmitter, etc. If you know of a blind amateur or blind person interested in radio, tell him about this new magazine; better still, buy him a copy, or several copies. Address Robert Gunderson, W2JIO, 980 Waring Avenue, New York 67, N. Y. The publisher also solicits articles suitable for publication.

HANDY'S 25TH

Francis Edward Handy, W1BDI, completed 25 years of service on the ARRL Hq. staff on February 20th, and 16 members of the "Ten Year Club" gathered that evening for a dinner in his honor, with President Bailey as our guest. "FEH" was presented with a leather-bound and inscribed copy of the first edition of *The Radio Amateur's Handbook*, which he wrote practically single-handed in 1926. Although the annual revision of the *Handbook* is now a major staff job and more than two million copies have been published and sold, the book is still affectionately referred to as "Handy's Handy Handbook."

Ed Handy first came to the attention of Hiram Percy Maxim, then ARRL president, in 1924 as a result of the outstanding performance of 1BDI up in Augusta, Me. When in 1925 Traffic Man-

(*Continued on page 110*)

16th Sweepstakes Contest

Part I: Final Results—C.W. Section

HERETOFORE, both the c.w. scores and the 'phone scores in each Sweepstakes Contest have been reported in one issue of *QST*, usually a late-spring or early-summer number. Since last summer, however, our contest reporting schedule has been pushed ahead. In order to bring you the results of the 1949 DX Contest earlier, the final scores were reported in two parts, the first listing c.w. and the second the 'phone standings. The 1949 SS will be treated in the same manner, so that earlier reporting may be accomplished. 'Phone results will appear in May *QST* and will be accompanied by photographs of the star performers in both contest sections.

Award Winners

Competition for awards is, under the SS rules, among amateurs in each ARRL section. Entries were received from 952 c.w. contestants and individual awards are being made in each of the 72 sections. The winners are those first-listed in each section tabulation under the heading "Scores." Hearty congratulations to the SS champions!

Highlights

As a score and sections-worked record breaker, the 16th Sweepstakes was without peer. In the preceding four contests, the number of contestants scoring more than 100,000 points has been used as an index of operating performance. The number of operators reaching the six-digit mark in 1946 was a mere handful — eight. In the two Sweepstakes events following, the total soared first to 53, then to 82. Continuing this upward spiral, the 1949 SS brought scores above 100,000 from 92 contestants. Such figures are clearly indicative of the ever-increasing operating proficiency of those amateurs who have formed the SS habit!

Perhaps a more notable indicator of operator ability in this SS was the number of contestants who made a clean sweep of all sections on c.w. The final results show the calls of 34 brass-pounders who worked all of the League's 72 sections. If anyone thinks this is an accomplishment easily attained, let him try working them all in the '50 Sweepstakes!

So many contestants turned in praiseworthy performances that space does not permit us to give them the special mention they might deserve. However, in order to give all participants an idea of how they stacked up against leaders in their geographical area, and also to give some measure of credit to the high scorers, the tabulation below shows the top score in each licensing area:

W1JYH	117,150	KP4KA	106,776
W2IOP	175,903	KL7SQ	25,498
W3BES	183,600	KZ5WZ	60,401
W4FU	185,400	VE1AR	68,325
W5PKF	141,379	VE2NI	62,319
W6WIP	164,430	VE3KE	112,350
W7KEV	146,160	VE4NS	34,860
W8CEG	118,853	VE5QZ	93,543
W9RQM	152,600	VE6UB	51,810
WØDYX	146,160	VE7AEC	65,462
KH6IJ	62,964	VE8AK	2,500

The determination of standings in the club competition of the 16th Sweepstakes must await completion of the 'phone checking detail. A tabulation showing club results will appear next month along with the 'phone results. — *J. M.*

SCORES

Sixteenth Sweepstakes Contest

Scores are grouped by Divisions and Sections. . . . The operator of the station first-listed in each Section is award winner for that Section unless otherwise indicated. . . . Likewise the "power factor" used in computing points in each score is indicated by the letter A or B. . . . A indicates power up to and including 100 watts (multiplier of 1.25), B indicates over 100 watts (multiplier of 1). . . . The total operating time to the nearest hour is given for each station and is the last figure following the score. . . . Example of listings: W3BES 183,600–1022–72–A–40, or, final score 183,600, number of stations 1022, number of sections 72, power factor of 1.25, total operating time 40 hours. . . . Stations manned by more than one operator are grouped in order of score following single-operator station listings in each section tabulation; calls of participants at multi-operator stations are listed in parentheses.

ATLANTIC DIVISION

E. Pennsylvania

W3BES	183,600–1022–72–A–40	W3ISE	64,790– 418–62–A–31
W3CPV	137,160– 762–72–A–39	W3DVC	63,395– 410–62–A–26
W3FUF	125,235– 726–69–A–39	W3LVF	77,438– 525–59–A–37
W3HRD	120,600– 670–72–A–40	W3KDF	58,870– 407–58–A–38
W3GHM	118,215– 667–71–A–38	W3ADE	52,365– 355–59–A–30
W3EQA	114,660– 640–72–A–38	W3CHV	44,550– 405–55–B–28
W3OCU	111,388– 637–70–A–36	W3GHD	42,600– 240–71–A–12
W3BXE	108,000– 600–72–A–36	W3EAN	42,480– 360–59–B–23
W3CPS	104,388– 604–70–A–38	W3CTJ	37,973– 250–61–A–27
W3KEW	100,800– 576–70–A–40	W3ENH	36,125– 289–50–A–26
W3KT	99,311– 560–71–A–35	W3KBH	34,293– 319–43–A–34
W3ARK	94,316– 694–68–B–39	W3CHH	34,200– 240–57–A–27
W3EVW	86,400– 480–72–A–35	W3NOK	32,292– 302–54–B–32
W3ALB	85,120– 532–64–A–40	W3PUP	30,398– 290–42–A–40
W3GYV	83,424– 484–69–A–29	W3BTP	30,238– 205–59–A–19
W3NTD	82,800– 480–69–A–21	W3ADZ	26,815– 173–62–A—
W3IXN	81,260– 478–68–A–35	W3JLJ	25,728– 251–41–A–27
W3HHK	71,445– 434–66–A–36	W3KMS	24,000– 200–48–A–15
W3FLH	66,965– 454–59–A–31	W3MJB	21,320– 166–52–A–27
W3EER	65,000– 400–65–A–26	W3CGS	13,680– 120–57–B–12
		W3DFJ	13,545– 130–42–A–27
		W3UKI	11,800– 118–40–A–19
		W2ZML/3	11,350– 114–40–A–19

W8JSA 9265- 109-34-A- 9
W8PUO 7969- 32-25-A- 9
W3KEK 5555- 101-26-A-15
W3MWC 6460- 95-34-B—
W3LN 6090- 58-42-A-12
W3ED 3531- 57-25-A- 8
W3OY 3255- 62-21-A-10
W3PST 1800- 40-14-A-12
W3NJD 1725- 30-23-A- 6
W1NJM/3 1640- 41-16-A—
W3FYK 1008- 28-18-B- 6
W3GDI 858- 25-14-A- 3
W3MGL 690- 23-12-A- 6
W3KBZ 158- 9- 7-A- 1
W3QS 123- 7- 7-A- 2
W3NHX 40- 4- 4-A- 3
W3PKV (W3s DYL MYL NKU NOH PKA) 66,719- 440-61-A-38

Md.-Del.-D. C.

W3DPA 140,040- 778-72-A-35
W3GAU 138,000- 801-69-A-36
W3EIS 130,995- 738-71-A-38
W3FQZ 129,238- 740-70-A-38
W3JTC 126,735- 714-71-A-39
W3GRF 123,338- 715-69-A-40
W3FQB 118,300- 676-70-A-40
W3KDP 98,175- 561-70-A-38
W3IYE 97,920- 544-72-A-36
W3FYS 89,512- 543-66-A-36
W3DRD 81,180- 452-72-A-28
W3WV 63,650- 382-67-A-38
W3GBB 61,213- 415-59-A—
W3MCG 56,025- 374-60-A-37
W3LUL 48,240- 268-72-A-27
W3HVM 42,554- 289-59-A-31
W3PEF 41,600- 323-52-A-34
W3MFJ 37,914- 310-49-A-32
W3AEL 36,875- 250-59-A-17
W3FDJ 34,465- 284-61-B-24
W3HB[1] 29,469- 259-57-B-16
W3WU 23,800- 170-56-A-21
W3LVJ 22,960- 164-56-A-15
W3HTK 20,528- 161-51-A—
W3OQJ 15,416- 188-41-A-30
W3BWB 15,372- 185-42-B-25
W3KMN 15,255- 170-36-A-16
W3DQB 12,280- 154-32-A-24
W3OFU 11,880- 150-32-A-16
W3IL 9199- 112-33-A- 9
W3JTK 8880- 120-37-B- 5
W3PAY 5731- 66-35-A- 9
W3OPQ 5580- 72-31-A- 9
W3OPO 5475- 73-30-A- 8
W3OYX 1509- 37-17-A- 6
W3CDQ 782- 23-17-B- 6

So. New Jersey

W2IMU 131,250- 753-70-A-40
W2HEH 128,610- 715-72-A-36
W2PWP 126,875- 725-70-A-39
W2RDK 126,000- 700-72-A-40
W2FXN 120,405- 702-69-A-31
W2TNN 101,258- 587-69-A-40
W2ZVW 66,960- 419-64-A-27
W2YBL 50,040- 423-48-A-35
W2ZFC 31,200- 260-48-A-21
W2QCL 16,088- 143-45-A-14
W2BWW 11,005- 142-31-A-24
W2RXL 7711- 100-31-A- 9
W2SAI 286- 13-11-B—

W. New York

W2PJM 126,875- 725-70-A-40
W2SO 125,315- 709-71-A-38
W2RQH 103,759- 602-69-A-40
W2EMW 90,173- 547-66-A-38
W2PGU 60,052- 474-51-A-39
W2NCI 59,231- 487-61-B-40
W2RSV 57,500- 100-23-A-12
W2KEL 51,708- 417-62-B-40
W2NZH 49,551- 405-49-A-34
W2WZQ 45,008- 353-51-A-29
W2TRG 31,920- 224-57-A-29
W2DTV 25,750- 206-50-A-21
W2FBA 23,530- 181-52-A- 8
W2BXZ 22,173- 182-49-A-15
W2DUQ 19,760- 152-52-A-33
W2QQ 16,380- 158-52-B-16
W2ZAT 9320- 117-32-A-15
W2RZP 5265- 162-26-A- 7
W2EWT 4020- 67-30-B- 3
W2VGM 3250- 50-26-A-14
W2SJV 2000- 50-16-A- 6
W2RJJ 978- 23-17-A- 5
W2PYC 968- 22-18-A- 4

W. Pennsylvania

W3GJY 105,000- 600-70-A-39
W3LMM 81,650- 575-71-B-38
W3OEW 70,380- 409-69-A-30
W3NRE 59,150- 364-65-A-32
W3TXQ 59,094- 469-63-B-32
W3KQD 58,825- 362-65-A-33
W3HXA 58,290- 348-67-A-28
W3LEJ 52,020- 383-68-B-39
W3KWL 45,085- 254-71-A-23
W3GEG 42,210- 268-63-A-23
W3BWL 38,656- 302-64-B—
W3KUY 34,425- 306-45-A-22
W3KBC 33,002- 288-58-B-27
W3RWJ 26,880- 192-56-A-21
W3POW 25,190- 229-44-A-23
W3UVD 14,868- 159-38-A-18
W3DLL 13,918- 150-38-A-14
W3SCH 12,604- 137-46-B-19
W3ODU 12,161- 106-47-A-23
W3AVY 8250- 126-33-B-14
W3POZ 6344- 105-25-A-30
W3TTN 5720- 72-32-A-15
W3MMW 5610- 68-33-A-18
W3PJU 4000- 50-32-A- 8
W3PPH 3420- 57-24-A- 8
W3UHN 2550- 51-20-A-10
W3AKG 1943- 37-21-A- 8
W3PNC 683- 21-13-A- 8
W3ZKK/3 38- 5- 3-A- 1
W3QZF (W3s KOD KTE LIV LJQ LJS LQD PAO POP POZ RBH) 7360- 115-32-B—
W3PJU (W8ZKK) 4000- 50-32-A- 8

CENTRAL DIVISION

Illinois

W9ERU 138,863- 805-69-A-40
W9JNC 128,944- 749-69-A-38
W9WFS 125 730- 699-72-A-34
W9AEW 122,850- 702-70-A-39
W9NII 118,125- 675-70-A-40
W9PNE 111,860- 661-68-A-40
W9VFZ 107,565- 609-71-A-37
W9GFF/9 102,725- 588-70-A-35
W9OAT 99,450- 585-68-A-39
W9PVA 85,305- 517-66-A-40
W9UBP 72,963- 452-65-A-40
W9TMU 65,175- 400-66-A-31
W9FAU 63,096- 480-66-B-18
W9BTU 57,040- 357-64-A-38
W9WJS 54,240- 452-60-B-30
W9VOQ 52,480- 328-64-A-20
W9TCK 48,007- 397-61-B-31
W9YTV 39,544- 278-57-A-22
W9AJJ 38,240- 239-64-A-21
W9RCJ 37,125- 270-55-A-27
W9KWW 34,100- 250-55-A-30
W9APE 30,343- 229-53-A-21
W9ANY 26,399- 216-49-A-34
W9GDI 25,673- 163-63-A-14
W9EDH 17,799- 175-51-B-25
W9BPU 16,928- 111-61-A-12
W9CMU 10,631- 123-35-A-23
W9TAL 10,350- 90-46-A- 9
W9MRQ 9056- 142-32-B-10
W2VIF/9 8484- 101-42-B-10
W9YTS 7272- 101-36-B-14
W9WIO 5734- 70-33-A-10
W9FFR 5138- 69-30-A- 6
W9CEO 3393- 59-29-B—
W9FZE 2870- 44-28-A-13
W9HND 2794- 43-26-A-16
W9HNC 2228- 54-18-A-12
W9QJR 2125- 34-25-A- 5
W9DTC 2100- 57-15-A-11
W9GNG 650- 21-13-A-11
W9FDY 341- 20- 7-A- 9
W9IML 341- 16-11-B—
W9ZPC 176- 11- 8-A- 2
W9GDH (W9DOG) 40,656- 311-66-B-38

Indiana

W9EY 73,784- 442-67-A-34
W9VDB 51,975- 413-63-B-28
W9QLW 49,956- 362-69-B-18
W9UKT 47,171- 300-63-A-19
W9SFR 37,680- 237-64-A-31
W9FCF 32,890- 253-52-A—
W9UC 22,410- 208-54-B-20
W9YB 19,900- 202-50-B-22
W9NXU 17,820- 166-54-B-11
W9TT 17,078- 150-46-A-18
W9GFS 10,707- 125-43-B-22
W9YDP 1540- 39-20-B- 6

Wisconsin

W9RQM 152,600- 872-70-A-40
W9VSO 145,018- 817-71-A-40
W9LVR 137,160- 762-72-A-36
W9WEN 119,103- 673-71-A-40
W9AEY 118,490- 700-68-A-40
W9KZZ 109,480- 652-68-A-35
W9DJV 102,091- 610-67-A-36
W9CBE 63,158- 403-63-A-28
W9KXK 53,463- 329-65-A-38
W9CWZ 47,250- 300-63-A-34
W9GIL 46,118- 280-66-A-25
W9GKK 39,261- 321-49-A-30
W9ERW 34,580- 248-56-A-38
W9HDZ 34,450- 265-52-A-29
W9WJH 32,770- 226-58-A-24
W9RLB 24,063- 175-55-A-15
W9RKP 20,280- 169-60-B-15
W9MDG 17,400- 150-58-B-13
K9NRO 15,698- 137-46-A-19
W9FZC 12,512- 136-46-B—
W9WXD 8913- 116-31-A-31
W9GKO 8434- 87-39-A-23
W9DR 6270- 105-30-B-17
W9RSR 5890- 78-31-A- 9
W9CFL 5438- 74-30-A-13
W9CXY 4050- 60-27-A- 8
W9EBF 2800- 40-28-A- 5
W9RH 1909- 42-23-B- 5
W9WBN 1783- 31-23-A- 8
W9BCC 1650- 33-20-A- 7
W9DPN 1530- 34-18-A- 6
W9IQM 1035- 24-18-A- 5
W9ILR 180- 12- 6-A- 7
W9ZTO 110- 11- 4-A- 1
W9HHE 10- 2- 2-A- 1

DAKOTA DIVISION

North Dakota

WØSKI 62,502- 489-66-B-39
WØRRW 53,213- 328-66-A-36
WØBJG 49,208- 371-54-A-31
WØLHS 27,825- 187-60-A-18
WØCAQ 17,044- 154-45-A-13

So. Dakota

WØPHR 102,350- 637-65-A-39
WØPIG/Ø 16,440- 137-48-A-15
WØJLI 1400- 30-20-A- 7
WØSUJ 60- 6- 4-A- 1

Minnesota

WØYCR 145,284- 823-71-A-40
WØTKX 124,516- 703-71-A-40
WØFID 57,094- 365-63-A-23
WØPDN 7875- 75-42-A- 7
WØDNY 5550- 60-37-A-12
WØKYE 3520- 44-32-A-25
WØPIG 2013- 35-23-A- 2
WØKUI 270- 12- 9-A- 4

DELTA DIVISION

Arkansas

W5MSH 76,700- 472-65-A—
W5DRW 51,336- 360-72-B-26
W5EGY 23,121- 175-53-A-21
W5FMF 11,750- 100-47-A-15
W5ONL 7189- 107-27-A-15

Louisiana

W5PKF 141,379- 810-71-A-40
W5KC 124,200- 720-69-A-40
W5USN 118,890- 664-72-A-36
W5WG 93,010- 525-71-A-40
W5MCT 92,041- 551-67-A-40
W5BUK 72,226- 542-67-B-33
W5NGN 47,600- 300-64-A—
W5OM 22,980- 192-60-B-17
W5OLK 20,628- 165-51-A-27
W5BI 12,600- 120-42-A-10
W5NDV 8331- 108-31-A-19
W5PZI 2048- 39-21-A-17
W5HPW (W5HUY) 18,293- 136-54-A-28

Mississippi

W5WZ 41,594- 303-55-A-19
W5OTD 1838- 50-15-A- 8

Tennessee

W4IIY 111,435- 650-69-A-40
W4NNJ 101,500- 580-70-A-40
W4BAQ 88,573- 499-71-A-38
W4KH 68,000- 500-68-B—
W4BCR 63,665- 375-68-A-31
WØYDZ/4 35,210- 254-56-A-30
W4VOS 22,713- 200-46-A—
W4OEZ 19,723- 175-46-A-21
W4BAO 19,200- 160-48-A-12
W4FLW 10,676- 110-39-A-12
W4OOA 2415- 59-21-B-10
W4PSB 10- 2- 2-A- 2

GREAT LAKES DIVISION

Kentucky

W4FU 185,400-1030-72-A-39
W4KVX 163,980- 911-72-A-39
W4ZWR 103,180- 616-67-A-38

[1] Operated by W1JSB

W4YFA 101,080- 722-70-B-36
W4NKQ 66,208- 374-71-A-38
W4NIX 45,578- 309-59-A-32
W4IDU 23,140- 179-52-A-24
W4OMW 14,805- 142-42-A-12

Michigan

W8SCW 88,750- 625-71-B-39
W8BGY 84,420- 604-70-B-40
W8BDF 69,700- 410-68-A-30
W8GQB 68,224- 534-64-B-40
W8IXJ 62,270- 479-65-B-36
W8DDR 51,590- 310-67-A-31
W8URM 49,590- 343-58-A-22
W8TRN 35,520- 296-48-A-17
W8NOH 34,253- 287-62-A-25
W8BNU 27,115- 247-44-A-27
W8BXZ 23,600- 237-40-A-21
W8OAF 18,816- 194-49-B-22
W8UQR 16,581- 190-35-A-18
W8GP 16,012- 153-42-A-14
W8DSE 13,340- 115-58-B-17
W8CYG 13,200- 161-33-A-14
W8KPL 10,224- 72-71-B-11
W8ZZ 8525- 110-31-A-16
W8BWS 4689- 61-31-A- 8
W8DBG 3173- 47-27-A-17
W8EGI 2520- 42-24-A- 9
W8WVL 2486- 58-17-A- 9
W8MGQ 2200- 40-22-A- 8
W8ERT 1853- 39-19-A-11
W8JCY 1632- 34-24-B- 7
W8ENE 228- 13- 7-A-10
W8NML 60- 6- 4-A- 3
W8CBM 23- 3- 3-A- 3
W8RRT (W8DLZ) 57,525- 357-65-A-36

Ohio

W8CEG 118,853- 689-69-A-25
W8OYI 116,338- 675-69-A-40
W8UZJ 114,718- 683-69-A-37
W8RSW 90,125- 515-70-A-39
W8SMC 88,770- 540-66-A-36
W8YJE 87,630- 509-69-A-39
W8YPT 84,387- 618-69-B-36
W8BTI 77,888- 465-67-A-28
W8ZJM 72,243- 409-71-A-29
W8EHH 70,700- 404-70-A-34
W8NZI 70,290- 426-66-A-34
W8BOJ 64,488- 385-67-A-22
W8LHV 64,103- 393-66-A-33
W8DQC 62,100- 360-69-A-19
W8EXI 59,565- 361-66-A-37
W8ZWX 58,710- 414-57-A-34
W8VQI 56,420- 405-56-A-38
W8QHV 52,363- 355-59-A—
W8AVT 46,044- 350-53-A-35
W8DAE 43,819- 309-57-A-22
W8UPB 43,440- 364-48-A-27
W8TAQ 42,140- 301-70-B-32
W8CEA 41,985- 316-54-A-31
W8CLM 41,023- 269-61-A-31
W8NSS 40,826- 290-57-A-31
W8YGR 38,940- 236-66-A-27
W8AL 35,916- 245-59-A-39
W8DWP 31,500- 227-56-A-33
W8NPF 25,075- 171-59-A-21
W8MXO 25,031- 225-45-A-22
W8PCS 24,640- 177-56-A-19
W8ZCK 23,524- 187-51-A-17
W8PYX 21,420- 210-42-A-19
W8KMP 21,333- 186-46-A-16
W8KNP 20,700- 180-46-A—
W8KJK 20,500- 200-41-A-18
W8CTP 20,150- 202-50-B-16
W8WZ 19,600- 200-49-B- 7
W8DFD 17,361- 162-43-A-20
W8ZHP 16,875- 151-45-A-25
W8LCO 13,659- 112-49-A-13
W8CZL 11,590- 123-38-A-19
W8EYE 11,220- 85-66-B-10
W8SHI 10,780- 98-44-A-11
W8HFE 10,238- 105-39-A- 7
W8ZTA 9026- 125-29-A-14
W8WRN 8880- 122-37-B-28
W8AMH 6719- 109-25-A-20
W8DNU 6006- 80-31-A-16
W8YBP 5535- 86-27-A- 9
W8YGQ 4680- 78-30-B- 8
W8OUR 4000- 64-25-A- 3
W8WAB 3938- 75-21-A- 7
W8ENH 3540- 59-24-A- 7
W8ABE 3160- 40-32-A- 8
W8QYI 3120- 52-30-B- 6
W8CSY 2904- 51-23-A-11
W8ETK 2783- 53-21-A-10
W8EKL 2678- 51-21-A-23
W8VEL 2625- 53-20-A- 8
W8VDF 1733- 34-21-A-11
W8BEW 1620- 36-18-A- 4
W8BUM 1250- 25-20-A- 5
W8TTJ 1200- 30-16-A- 3
W8OHO 938- 25-15-A- 5
W8SQW 880- 28-16-B- 6
W8ONT 816- 26-16-B- 7
W8ZQU 760- 19-16-A- 5
W8DYZ 715- 23-13-A- 6
W8KS 595- 17-14-A- 1
W8ZKK 128- 13- 7-A- 3
W8ADF 40- 4- 4-A- 1
W8UEY 15- 3- 2-A- 1
W8RDZ 4- 2- 1-B- 1
W8ZQH (W8s ZQD ZQH) 85,523- 557-63-A-38
W8URD (W2VXF W8s AVT DAD PJU YBP YEA ZKK) 33,303- 333-51-B-34
W8DAD (W8DAD and Philip Steyko, jr.) 30,993- 253-49-A-30
W8FT (W8s CES, CXN, TAO, UN, YFO, WE) 10,160- 127-32-A-19

HUDSON DIVISION

E. New York

W2JBQ/2 79,600- 498-64-A-38
W2KNR 52,780- 377-56-A-29
W2NQW 19,250- 175-44-A-23
W2BZO 14,405- 134-43-A—
W2TER 13,889- 136-41-A-19
W2KFB 12,915- 126-41-A-13
W2CLL 7250- 125-29-B- 3
W2GTC 4860- 81-24-A-16
W2VYY 4785- 88-22-A-11
W2CJM 2470- 38-26-A- 9
W2TYC 2161- 46-19-A- 7
W2EQD 132- 11- 6-B- 1

N.Y.C.-L.I.

W2IOP 175,903- 991-71-A-38
W2AQX 91,511- 531-69-A-39
W2PZE 89,930- 529-68-A-36
W2KPA 88,105- 527-67-A-37
W2KTF 79,520- 563-71-B-38
W2GXC 76,650- 511-60-A-34
W2GTL 67,130- 480-70-B-38
W2WZ 60,480- 433-70-B-25
W2LPJ 59,160- 408-59-A—
W2HAQ 58,310- 418-70-B-39
W2ZV 51,060- 296-69-A-39
W2AOD 45,994- 335-55-A-35
W2YDG 41,580- 265-63-A-20
W2PVV 31,928- 307-52-B-33
W2GP 30,800- 200-56-A-26
W2AZS 29,220- 244-60-B-23
W2NHE 29,095- 266-44-A—
W2QDT 29,008- 283-41-A-38
W2OTC 28,905- 308-47-B-17
W2NDQ 21,528- 234-46-B-28
W2VL 20,072- 193-52-B-17
W2ESZ 19,028- 179-43-A-25
W2AHC 16,695- 126-53-A-22
W2FQW 15,910- 172-37-A-17
W2LGS 15,695- 146-43-A-13
W2ZDO 15,435- 172-36-A-17
W2UYX 14,145- 138-41-A-11
W2LQP 13,438- 125-43-A—
W2ZKK 13,040- 170-32-A-16
W2ETT 11,708- 113-42-A-14
W2MPL 11,178- 122-46-B-18
W2CEV 10,880- 128-34-A-22
K2BH 7290- 82-36-A—
W2QBS 6045- 78-31-A- 7
W2DBI 5775- 66-35-A-12
W2JSV 5467- 81-27-A-15
W2AWH 5193- 67-31-A-12
W2OBU 4758- 87-22-A- 6
W2BOY 4600- 80-23-A-21
W2MDM 4389- 67-33-B- 6
W2RPZ 3570- 68-21-A-10
W2TUK 3500- 70-20-A- 4
W2VBT 3060- 51-24-A- 4
W2WC 1440- 48-24-A- 5
W2LGK 320- 16- 8-A- 2
W2LNP 198- 11- 9-B—
W2CB 160- 8- 8-A- 1
W2AAB 120- 8- 6-A- 1
W2BHJ 23- 3- 3-A- 1

N. New Jersey

W2BXA 134,575- 774-70-A-40
W2GFG 118,925- 710-67-A-40
W2NNL 116,900- 673-70-A-40
W2YLS 110,938- 625-71-A-40
W2BTG 106,855- 602-71-A-40
W2TNA 94,703- 550-69-A-38
W2CWK 94,616- 549-69-A-35
W2EQS 93,754- 551-69-A-20
W2OOC 86,423- 502-69-A-40
W2LXI 72,865- 435-67-A-28
W2EWZ 67,125- 448-60-A-39
W2ATE 66,578- 404-66-A-32
W2TPJ 60,075- 402-60-A-32
W2VJM 60,008- 382-63-A-27
W2KKR 50,400- 360-56-A-29
W2AYG 38,250- 300-61-A-38
W2NIY 36,146- 285-51-A-27
W2GFW 33,977- 279-61-B-17
W2WRG 27,615- 263-42-A—
W2JEW 23,813- 191-50-A-20
W2ABL 23,500- 200-47-A-15
W2VYB 22,000- 177-50-A-21
W2BQU 17,588- 201-35-A-31
W2ZEP 16,000- 200-32-A-23
W2MPP 14,606- 144-41-A-21
W2CW 9900- 152-33-B-10
W2YOB 9690- 102-38-A-18
W2SOY 8750- 100-35-A- 7
W2UWK 7380- 124-24-A-14
W2ILF 3450- 58-30-B-10
W2YCM 3360- 58-24-A- 9
W2LTP 1406- 37-19-B- 2
W2GNW 840- 28-15-B- 4

MIDWEST DIVISION

Iowa

WØNCS 109,725- 630-70-A-40
WØFZO 97,720- 706-70-B-39
WØQVA 97,155- 573-68-A-40
WØKYX 92,833- 526-71-A-38
WØBQJ 82,075- 469-70-A-31
WØATA 63,473- 407-63-A-38
WØHQA 48,480- 306-64-A-30

(*Continued on page 110*)

WØRTI [47,319- 286-67-A-36
WØNYX 45,750- 305-60-A-26
WØNWF 25,144- 226-56-B-27
WØUSN 19,062- 177-54-B-12
WØWLL 14,175- 161-36-A-29
WØCJG 13,613- 121-45-A-19
WØYRN 8600- 108-32-A-19
WØWFP/Ø 1403- 32-23-B- 3
WØVRA 300- 15-10-B- 2

Kansas

WØDYX 146,160- 812-72-A-40
WØDJE 62,067- 409-61-A-33
WØWBC 48,575- 335-58-A-33
WØTSA 46,513- 305-61-A-22
WØIUL 29,680- 218-56-A-29
WØUKH 22,050- 181-49-A-35
WØKXL 20,910- 164-51-A-19

Missouri

WØQDF 83,425- 470-71-A-34
WØDEA 76,300- 549-70-B-38
WØGBJ 67,134- 501-67-B-34
WØPME 58,275- 392-60-A-32
WØDU 54,072- 376-72-B-23
WØQFH 25,000- 200-50-A-27
WØJYL 15,300- 121-51-A-28
WØACK 8458- 100-34-A-20
WØNNH 3904- 61-32-B-11
WØAEJ 2778- 51-22-A- 7
WØKIK 2280- 39-24-A-13

Nebraska

WØOYB 106,088- 615-69-A-37
WØFQB 39,615- 352-57-B-29
WØAWN 38,432- 285-55-A—
WØHSO 9458- 97-39-A- 8
WØVML (WØs BDQ, JPI, QAN, VDC, VEC, WGB) 46,035- 354-54-A-40

NEW ENGLAND DIVISION

Connecticut

W1TS[1] 114,625- 655-70-A-40
W1BIH 112,713- 640-71-A-40
W1LVQ 100,323- 713-71-B-40
W1RY 85,590- 476-72-A-27
W1FTX 81,375- 466-70-A-33
W1JMI 81,175- 479-68-A-39
W1RWS 70,183- 420-67-A-28
W1QIS 58,169- 443-53-A-33
W1ODW 56,453- 359-63-A-39
W1CEG 54,600- 420-52-A-33
W1LHE 52,448- 333-63-A-34
W1DX 45,430- 308-59-A-20
W1AQT 42,720- 267-64-A-29
W1MTR 34,088- 307-45-A-29
W1VG 32,630- 251-65-B-19
W1GVK 33,818- 251-54-A-24
W1NJM 31,800- 265-48-A-13
W1DIT 23,423- 199-59-B-23
W1RUR 13,208- 128-52-B-13
W1ASO 12,675- 170-30-A-31
W1LIG 10,871- 112-39-A-12
W1BDI 8250- 125-33-B-10
W1RFC 8000- 100-32-A-20
W1FWH 7956- 117-34-B-19
W1KDQ 6200- 80-31-A-16
W1FSH 5148- 78-33-B- 6
W1RFJ 4675- 85-22-A-14
W1HYF 1219- 38-13-A- 5
W1DJC 560- 20-14-B- 1
W1NZM 293- 13- 9-A- 2
W1LV 150- 10- 6-A- 3

[1] Hq. staff member. Not eligible for award.

A 2-Meter Station for the Novice

Part III†—The Modulator, Power Supply, and Control Unit

BY EDWARD P. TILTON,* W1HDQ

In the previous installments we have described a converter for 144-Mc. reception and a simple transmitter r.f. unit. This month's equipment comprises the accessories necessary to make these two units into a complete working station — a modulator for the transmitter, and a power supply capable of handling the power requirements of all the other components. Also detailed is a control and cabling system for convenient on-the-air operation of the station.

None of the dimensions in these items is critical, and the constructor will very likely find that they are the easiest of the series to build and adjust. No layout drawings are provided, as there is no necessity for following the original designs in exact detail. Nor is it at all necessary to use parts that are exact duplicates of the original, though the manufacturers' part numbers are given in most cases.

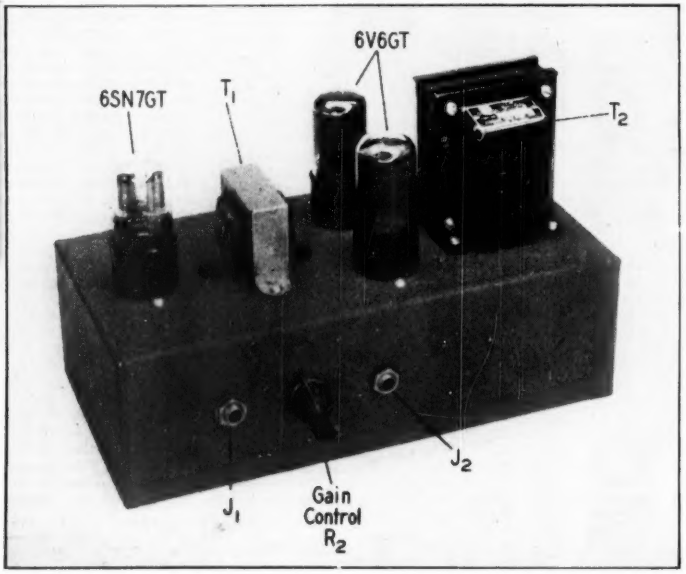
The Modulator

As most operation on 144 Mc. is by means of voice (A3 emission) or tone-modulated telegraphy (A2), it is necessary to have a modulator as part of our 2-meter station. A suitable modulator design is shown in the first photograph, and the schematic diagram is given in Fig. 5. The modulator is nothing more than a common audio amplifier, with an output transformer of suitable design so that the power input to the final stage of the transmitter may be modulated (varied) in proportion to the variations in level of the operator's voice. The only essential difference between the modulator and an audio system such as used in a receiver or a phonograph amplifier is in the type of output transformer used. In our modulator the output transformer (T_2) is designed to carry the current to the final stage of the transmitter through its secondary winding. The audio voltage developed in the modulator is thus added to or subtracted from the voltage impressed on the final stage — a simple explanation of the modulation process.

Only three tubes are used in the modulator. The first is a 6SN7GT dual triode, the first section of which is connected as a grounded-grid amplifier, with the microphone inserted in its cathode lead. This very simple arrangement does away with the necessity for a microphone trans-

* V.H.F. Editor, *QST*.

† Parts I and II of this article appeared in the Feb. and March issues of *QST*, respectively.



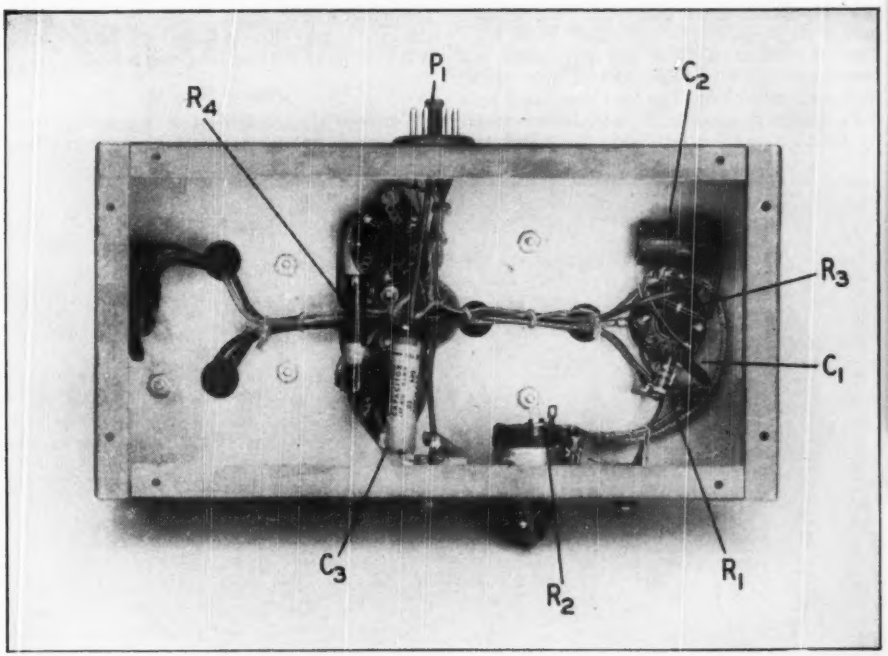
Modulator for the 2-meter station.

former, and also takes care of the current necessary for the operation of a carbon microphone. These are, in fact, the reasons for the use of the stage at all, as the following triode amplifier provides more than enough gain for the 6V6GT modulators.

The potential output capability of the modulator is considerably in excess of the requirements of the transmitter. It was considered advisable to design it in this way so that, with minor changes, it could be used with a higher-powered transmitter at a later date if desired. The output transformer has a 25-watt rating, so the modulator could be used with a transmitter of 50 watts or more, if altered slightly as to operating conditions. There is no harm in having an oversized modulator, so long as the operator is careful to keep the gain control (R_2) set for only as much power output as is needed to modulate the power input being used.

It is often desirable to be able to transmit in code when working on 144 Mc. Use of a keyed tone of constant pitch provides a somewhat more readable signal under adverse conditions than does voice modulation, and communication with this type of modulation (usually called m.c.w.) is an excellent way to build up one's proficiency with the code. Fortunately, inclusion of tone modulation is possible with almost no increase in complication or cost, by merely providing a means of feed-back in the modulator. The condenser C_3 is used for this purpose, feeding back energy from the modulator output into the primary of the input transformer. The key is plugged into J_2 (note that this jack is *insulated* from the panel). It may be left there permanently, if so desired, and tone modulation is thus constantly available. The pitch of the tone may be varied by changing the value of the feed-back condenser, C_3.

Construction of the modulator is extremely simple, and almost no special precautions are necessary. The heater leads and the leads to the gain control were wired with shielded wire, to forestall any chance of r.f. feed-back or hum pick-up, but this is probably not absolutely necessary in such a simple circuit. Nothing about the parts arrangement is critical, and almost any convenient layout may be used with good results. Other tubes and different components may also be used. For example, if one wants to build a smaller unit, miniature tubes (12AU7 amplifier, 6AQ5 modulators) may be substituted, and a smaller output transformer may be used. The layout shown has the advantage of being converted easily to higher-power service, however.



Bottom view of the modulator. The 6SN7GT socket is at the right. Extra leads to the modulation-transformer secondary are taped together at the left.

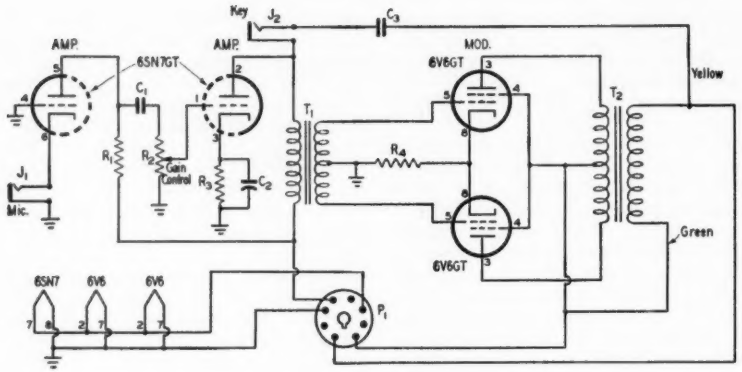


Fig. 5 — Wiring diagram of the modulator for the 2-meter station.

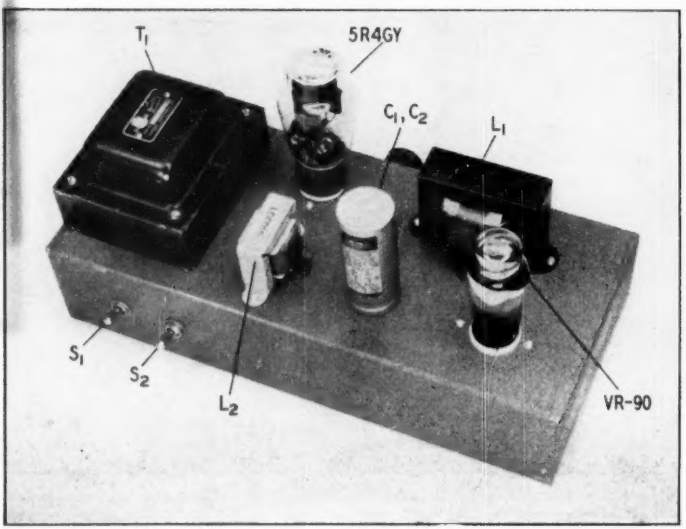
C_1 — 0.01-μfd. disc-type ceramic.
C_2 — 25-μfd. 25-volt electrolytic.
C_3 — 0.003-μfd. tubular.
R_1 — 47,000 ohms, ½ watt.
R_2 — 0.5-megohm potentiometer.
R_3 — 1500 ohms, 1 watt.
R_4 — 250 ohms, 10 watts.
J_1, J_2 — Open-circuit jack.
P_1 — Retainer-ring type plug, 8-pin male (Amphenol 86-CP-8).
T_1 — Small input transformer, single plate to push-pull grids (Stancor A-4713).
T_2 — Modulation transformer, push-pull 6V6s to 5000-ohm load (Stancor A-3845).

Operation of the modulator will be covered later, in the discussion of the final set-up for the complete station.

Full modulation and best quality are possible only if the modulator is "matched" to its load. The transformer used in this equipment has secondary taps for impedances of 8000, 6500, 5000, and 3000 ohms. The load impedance that the amplifier presents to the modulator is found by Ohm's Law. Simply divide the final plate voltage by the plate current. In this instance we have the plate voltage, 250, divided by the plate current, 0.05 amp., or a load impedance of approximately 5000 ohms. If a transformer other than the one specified is to be used, be sure that it is capable of working into such a load.

Power Supply

Power-supply equipment is something that everyone must have to run a station, regardless



Power supply for the 2-meter station. This one unit delivers the necessary a.c. and d.c. power for the transmitter, modulator and converter.

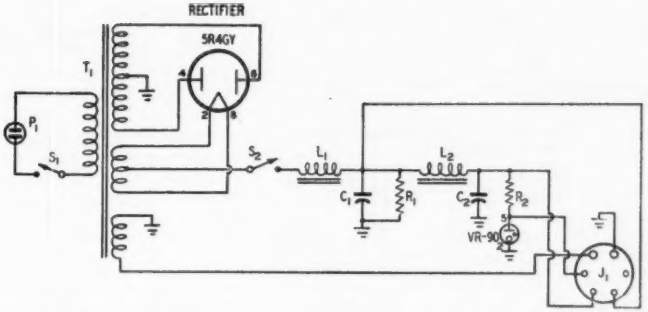


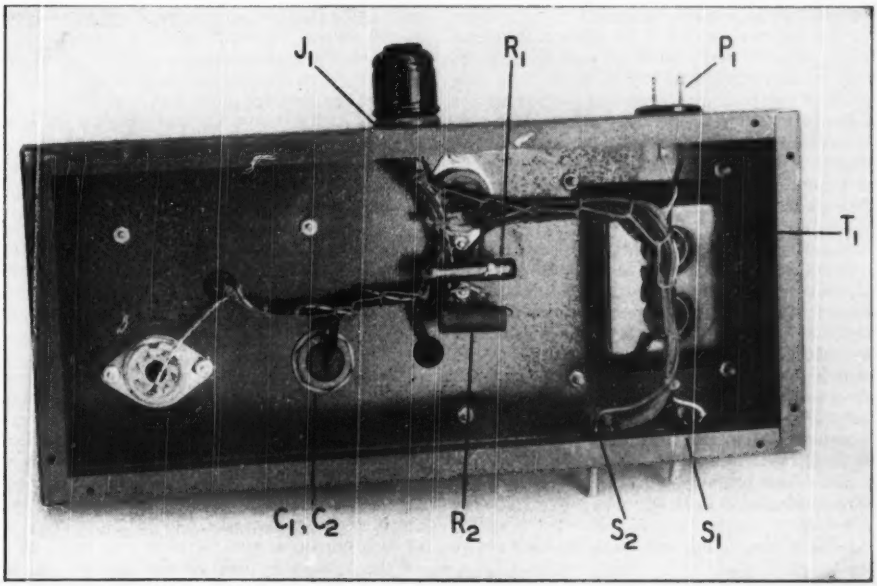
Fig. 6 — Schematic diagram of the power supply.

C_1, C_2 — Dual 8-μfd. 450-volt electrolytic condenser.
R_1 — 50,000 ohms, 10 watts.
R_2 — 2500 ohms, 10 watts.
L_1 — 7-hy. 150-ma. filter choke (Stancor C-1710).
L_2 — Any small filter choke, 50-ma. or more rating.
J_1 — Retainer-ring type plug, 6-pin female (Amphenol 78-S6).
P_1 — Retainer-ring type 115-volt receptacle (Amphenol 61-M).
S_1, S_2 — Single-pole single-throw toggle switch.
T_1 — Power transformer: 700 volts at 200 ma., center-tapped; 5 volts at 3 amp., center-tapped; 6.3 volts at 5 amp. (Stancor P-6314).

of the type of operation he engages in. And we all need low-voltage supplies, too, so it pays to build a good one right at the start. There will always be uses for it later on. The power supply for our 2-meter station handles both the transmitter and the receiver, switching of the various circuits being handled by a control unit, shown in the composite photograph in Part I of this series. Details of the control unit and cabling system are shown in Fig. 7.

Looking at the schematic diagram of the power supply, Fig. 6, it may be seen that a 2-section filter system is used, but the second section supplies only the converter and the speech amplifier. These stages require better filtering than do the modulator tubes and the transmitter r.f. section, but they draw only a small amount of current, permitting a small inexpensive filter choke (L_2) to be used in the second section. The first filter choke, L_1, must be of larger construction, as the

Bottom view of the power supply.



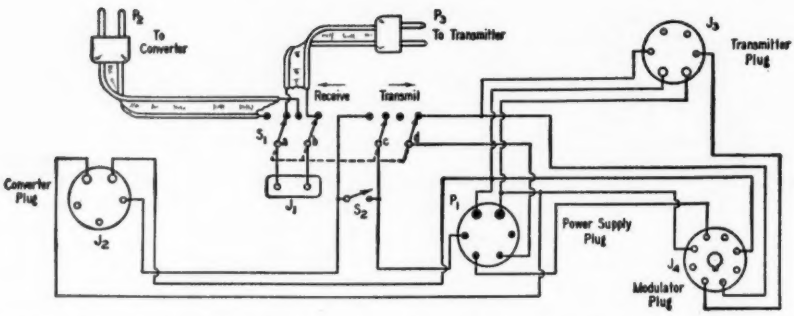


Fig. 7 — Diagram of the cabling system used to supply power to the various units in the 2-meter station.

J_1 — Antenna terminal — standard crystal socket (Millen 33102).

J_2 — Multiwire cable connector, 5-pin female (Amphenol 78-PF5).

J_3 — Multiwire cable connector, 6-pin female (Amphenol 78-PF6).

J_4 — Multiwire cable connector, 8-pin female (Amphenol 78-PF8).

P_1 — Multiwire cable connector, 6-pin male (Amphenol 86-PM6).

P_2, P_3 — 300-ohm line plug (Millen 37412).

$S_{1A, B, C, D}$ — 4-circuit 2-position rotary switch (Mallory 3234J).

S_2 — Single-pole single-throw toggle switch.

entire current drain of the station runs through it.

More stable operation of the converter is possible if its plate voltage is maintained at a constant value, regardless of load and line-voltage variations. This is accomplished with a gaseous voltage-regulator tube, the output of which is used on the converter tubes only. Either a VR-90 or a VR-105 may be used.

Two toggle switches control the operation of the power supply. One is connected in the primary circuit of the power transformer and the second in the lead to the rectifier filament center tap. It is thus possible, by means of S_2, to have the 6.3 volts a.c. applied to the tubes in the transmitter, receiver and modulator, and still have no high voltage applied to any of these units. The primary switch, S_1, is closed first, allowing the tubes to reach operating temperature, before S_2 is thrown to the "on" position. Be sure that this process is always followed, as application of the plate and heater voltages simultaneously will damage the 6J6 tubes in the transmitter.

The Control Panel

Arranging a satisfactory control system is one of the most difficult jobs in assembling a satisfactory station for some amateurs. Ideally, the complete operation of the station should be controlled from one switch, the functions of which include turning on the transmitter, cutting off the receiver, and switching the antenna from one unit to the other, all in a single motion. In large amateur stations these functions are usually accomplished (in an infinite variety of ways) by means of one or more relays, operating from the main control switch. In our set-up we handle the job with a single inexpensive selector switch capable of connecting four leads to either of two positions.

A glance at the diagram of the control circuits, Fig. 7, will show how this is done. The main control switch, S_1, carries two circuits for the antenna, one for the high voltage for the transmitter, and one for the regulated voltage for the converter. When the switch is in the "transmit" position, as in Fig. 7, it will be seen that all the transmitter circuits are supplied with the necessary voltages through S_{1d}, and the antenna is connected through the switch to the transmitter terminals through sections *a* and *b*. If S_2 is left open there will be no plate voltage on the receiver circuits. Then, when we throw the control switch to the "receive" side the transmitter is disabled, the plate voltage is applied to the receiver through S_{1c}, and the antenna is connected over to the receiver input terminal. The switch S_2, seen in the composite photograph, Part I, at the lower right of the control panel, is included so that the receiver can be operated while the transmitter is on, for monitoring purposes if desired.

Just above the main control switch is the antenna terminal, into which the feeder from the antenna system is plugged. This is a standard crystal socket, as convenient plugs for these sockets, for use with 300-ohm line, are now available from several manufacturers. The ones used here are Millen type 37412.

There is an elementary safety point in laying out power cabling in radio work that is often overlooked. The "hot" terminals in the power circuits should be recessed so that no contact can be made with them by the operator, if the power supply is accidentally turned on when no connection is made to it externally. This calls for the use of female-type connectors on the power side of such junctions, with the male type being used on the detachable part. At the opposite end of

the cable the reverse is true, of course.

Making up the cables will be simpler if several colors of wire are available, as it is difficult to keep them identified otherwise. When the cable wires have been made up and soldered in place the system can be made neat by lacing up the cables. Waxed lacing twine made especially for this purpose is available, but soft cotton package twine may be used. Lacing up the power wiring under the chassis of the two units is a refinement that adds to their neatness.

Final Tests and Operation

We are now about ready to go on the air with our complete station. A convenient arrangement of the component parts is shown in the composite photograph, Part I. The power supply and transmitter r.f. unit are mounted in a simple wooden rack to conserve space and make for convenience in testing and operation. The rack is made of 1 by 2-inch wood, known as furring strip in the lumber yards. Its construction should be obvious from a glance at the photograph.

The control panel is screwed to the rack at the lower right side, so that the change-over switch and the converter dial, the two most-used controls, are near together. Obviously, this layout was set up for a right-handed operator, but there is nothing critical about the arrangement, and it may be altered to suit one's own ideas and personal preference.

Before putting the unit on the air we will check out the final set-up with a dummy load. With the cables connected properly and the 300-ohm lines plugged into their terminals on the transmitter and converter we are ready to go. The 15-watt bulb that was connected to the transmitter for the initial tests may now be plugged into the antenna terminal, J_1, on the control panel. Throw the primary switch in the power supply on, and allow the tubes in all units to heat up. Then turn on the plate power switch, S_2, with the main control switch in the "transmit" position. If the rig is tuned up properly, the lamp load will light up, though a somewhat different setting of the transmitter coupling coil, L_7 in Fig. 3, may be required. Final adjustment of the coupling to the antenna, and also the coupling between the tripler plate and final grid coils, may be done easily by tipping the transmitter unit up and resting it on the rack shelf with the bottom toward the operator. Check the neutralization adjustments carefully at this time.

When everything is in order, plug in the microphone and check for modulation, turning the gain control up until there is an appreciable brightening of the load lamp at ordinary voice level. Hold the microphone close to the lips, and turn the gain up only as far as is necessary to develop a satisfactory modulation level. Higher gain will result in overmodulation on voice peaks, and increase the pick-up of noises remote from the microphone.

If modulation produces a dimming of the lamp brilliance you have "downward modulation" which may result from too tight antenna coupling or insufficient grid drive. Check your 6J6s and make sure that the best ones are in the tripler and final-stage sockets, the best ones being those that give the highest grid current. The loading on the final, by either the lamp or the antenna, should be set at a point where there is still an appreciable dip in final cathode current when the final plate condenser is tuned through resonance. Increasing the coupling beyond this point will result in no increase in output, and going too far will actually reduce the output, and cause downward modulation. The position of the coupling coil may be different when the antenna is used, so a check should be made for upward modulation when the antenna is connected. A neon bulb held near the final plate coil should show an increase in brilliance when modulation is applied.

Next plug a key into J_2 in the modulator, and check the tone modulation. The quality of the note will usually be best with the gain control at a low setting, probably somewhat lower than is needed for voice modulation. The tone pitch may be raised or lowered by decreasing or increasing the value of the feed-back condenser, C_3.

Be sure that the oscillator and tripler controls and the coupling between the tripler and final stages are set carefully so as to give the greatest amount of grid current in the final tubes. Only when this condition is satisfied, and the coupling to the antenna is correctly adjusted, will the transmitted signal be of the best quality and strength.

Antenna Systems

The station is designed to operate with an antenna system fed with 300-ohm line. This can be the ribbon commonly used for television antenna installations, or the heavy-duty variety designed for high-powered transmitters. There are innumerable types of antenna systems that can be adapted to 2-meter work, and typical designs may be found in *The Radio Amateur's Handbook*, and the *A.R.R.L. Antenna Book*. New designs of special mechanical or electrical interest are published from time to time in *QST*.

Probably the simplest antenna, and one that is quite suitable for local work is the folded dipole, shown in Fig. 8. This may be made of any metallic rod or tubing stock that can be bent into the desired shape, or it may even be made of the 300-ohm line itself. The latter arrangement is often used for indoor antennas, with the dipole fastened on a wall of the operating room. Such an antenna may be used either vertically or hori-

(*Continued on page 118*)

50 Years of Progress—A Report on Amateur Radio

With Special Reference to the New Philosophy of Integers

BY LARSON E. RAPP,* W1OU

IT IS CUSTOMARY at the midpoint in a century to take inventory on progress, and it is a real pleasure when the field is amateur radio. While it is true that *QST* and other amateur journals have occasionally mentioned a few of the amateur contributions to the art of communication, the author has anticipated the need for a factual report that can be added to the similar works in other fields. The present paper is the result of 23 months of steady work, sifting the inconsequential from the significant and reducing the findings to definite argot.

Early in the work it was decided to confine the investigation to those problems peculiar to amateur radio and not duplicated in other communications fields as, for example, point-to-point, mobile, entertainment (including television and broadcasting), and diathermy. It was felt that such a report would show clearly the great strides made by radio amateurs, working silently in their basement workshops and attic laboratories. The work involved in preparing this paper was made difficult by the characteristic reluctance amateurs show in talking about their achievements, while quick to acclaim the work of a colleague, despite the low power and poor antenna location of said colleague. However, free-and-easy access was obtained to thousands of well-kept logbooks and other records, and many of the heuristic conclusions were reached only because this information was made available.

Amateur communication can best be studied by breaking it down into three parts which, for simplicity, will be called Part 1, Part 2, and Part 3. Other designations might be used, of course. These three parts will be found, upon close inspection, to be (1) the quality or "tone" of the signals involved, (2) the "readability" or Q factor of the signals, and (3) the "strength" of the signals. Let us examine them in detail.

Part 1—Tone

Early records clearly show that from the first days of amateur radio, at the turn of the century, there was a noticeable difference in the tones of signals emanating from different transmitters. This effect was marked enough to suggest to the early experimenters that the most logical system of amateur communication was simultaneous operation of many transmitters on the same frequency, or "wavelength" as it was known in those days, with the receiving operator skillfully utilizing the differences in tones to select aurally the desired signal. This system was found to work very well with one transmitter operating in any given area, or with one weak and one strong station, if the strong station was the desired one. This system was carried through into the middle '30s, with the accepted wavelengths, or "frequencies" as they had become known, being carefully selected to coincide with the amateur band limits, or "edges."

As interest grew in the "tone" of the signals, a scale was devised [1] to enable a receiving operator to report to the transmitting operator just what the tone of the signal was or should be. Cautiously named the "T" scale, it consisted of careful descriptions of the common types of signals in vogue at the time, numbered from 1 to 9 for easy identification. The records indicate that no amateur in the past 50 years has ever been complacent enough to stop short of perfection in the tone of his transmitter's signal, as is apparent by the sheer horror registered by an operator who receives a "T8" report, although by the accepted scale it is a legal signal and not far from perfect. It is rare indeed to hear a pedicular signal reported as "T7" or "T6," so great has been the technical progress of amateur radio. By checking back on transmitter designs, computing the transmitter waveform and modulation characteristics, and plotting these against tabulated reports recorded in logbooks, it is possible to reconstruct the entire picture. Fig. 1 is a plot of the progress in amateur tone reports, and no further comment

• We are fortunate this month in being able to present this significant work by the accepted authority in the field. The original calculations have been checked by our editorial staff and confirmed, but they are omitted from this presentation in the interests of national security.

* Kippering-on-the-Charles, Mass.

[1] Krausmeyer, "Why Not a T Scale?," *Journal of Applied Physics*, April, 1924; Rabinowics, "Yes, Why Not?," *Proc. I.R.E.*, Sept., 1924.

is necessary. Study it carefully — it is a glorious record of achievement.

Part 2 — Readability

The readability or "R" factor is a direct indication of the ease with which a signal can be copied, based on a scale of 1 to 5. When the scale was first introduced,[2] it was not unusual to hear readability reports of "R3" given to signals masked by noise or interference. However, despite increasingly-crowded bands, the accepted and taken-for-granted report is "R5," which means "Perfectly readable." The report of "R4," defined as "Readable with practically no difficulty," is reserved only for rare occasions when the signal is completely smothered by interference. It is, however, a true report, because the receiving operator will always acknowledge one of these smothered Readability 4 transmissions with "R OK, solid, FB," and other popular expressions. To the average bystander, such operating skill is beyond all comprehension, and naturally he never bothers to ask the receiving operator what was copied so solidly. After all, there is nothing like respect for genius.

[2] H. RES. 2751, Sept. 9, 1935, 74th Congress, 1st Session.

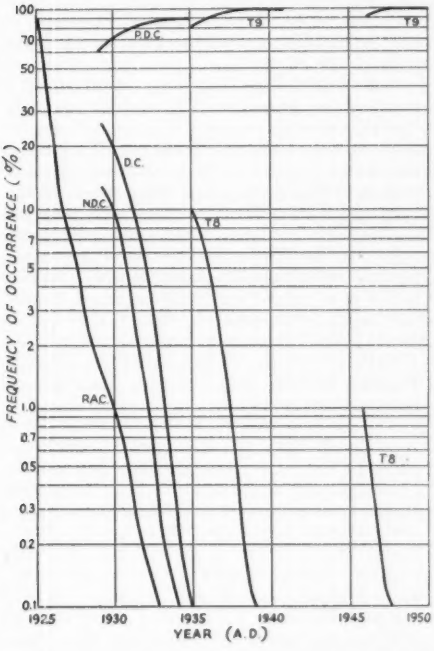


Fig. 1 — A plot of the frequency of occurrence of tone reports plotted against time. World War II and changes in reporting methods and government regulations account for the discontinuities.

The steady growth of T9 (earlier "P.D.C.") reports is in sharp contrast to the rapid falling off and eventual disappearance of less complimentary reports.

To the uninitiated, or newcomer to amateur radio, it is sometimes difficult to arrive at an exact readability report. There is no need for this if he follows one simple rule. The following equation, arrived at empirically after months of investigation, will give the correct report in every instance. For any given band and set of conditions, the readability report is given by

$$R = 2.5\left(2 - \frac{n}{f}\right)$$

where n = number of signals on the channel, and

f = operating frequency in Mc.

R is always given in the nearest whole number.

Part 3 — Signal Strength

Tabulation of the signal reports received by active stations during the past 50 years shows clearly the great advances that have been made. Despite no relaxing of the legal power limit by FCC and other licensing authorities, the average report has slowly climbed to its present exalted heights. Considering only the present "S" scale, based on values from 1 to 9, it is interesting to note that in the middle '30s it was not unusual for stations to carry on communication with "Strength 3" or "Strength 4" signals at each end of the circuit. Nowadays, however, through antenna developments and circuit refinements, the *average* level of signals is up around S7 or S8, with no change in the transmitter power.

As usual, the radiotelephone specialists, generally acknowledged to be more advanced than the so-called "c.w. men," have brought the improvement in efficiency to still greater heights. Most of their reports take the form of "20 db. over S9" ("S9" means "Extremely strong signals"), and some reports run up to 40 or 50 db. over S9, with preselector. The average nonamateur, with a little mathematics and engineering knowledge at his command, is hard put to explain a signal that has 100 to 300 times the field strength of an extremely strong signal, but such profound knowledge can only be acquired after many years in the field. It even has some of the c.w. men guessing, and studying antenna theory.

Another effect observed only by amateurs, but thoroughly attested to by their records, is the "QSL" or "DXCC" effect. To the layman, this can be stated simply as being "the increased strength a signal has when it originates from a country where there are relatively few amateurs." Odd as it may seem to the uninitiated, it can be proved definitely that a given field strength at a receiver will result in a louder signal out of the receiver when the signal originates in a rare country than when it comes from a domestic station. The effect is still under study, and no real con-

(*Continued on page 120*)

The World Above 50 Mc.

CONDUCTED BY E. P. TILTON,* W1HDQ

IONOSPHERIC DISTURBANCE — aurora DX — 50-Mc. opening to South America. Again, in February, 1950, this sequence of events worked out as in February, 1949, and almost exactly a year later. Sparing the 'phone DX Contest by a scant 12 hours, the predicted ionospheric disturbance broke on the morning of Feb. 20th wiping out most of the long-distance propagation on our DX bands for several days. A brilliant visible aurora appeared in the evening, and a fine c.w. session was set up for 50-Mc. enthusiasts. VE1QZ, Halifax, VE3s AET, ANY, and BBX, and Ws all the way from Maine to Virginia and across the northern part of the Middle West were in there making hay.

Then, on the following morning, true to expectations, HC2OT, Guayaquil, Ecuador, made his first U. S. appearance of the year on 50 Mc. It wasn't much of an opening; your conductor had just finished telling W1AW that he guessed nothing was going to happen, when HC2OT broke through for a few minutes starting at 9:37 A.M. EST. He was weak and wobbly, but reports were exchanged, and Steve went on to work W9ZHL, Terre Haute, Ind., at 10:07. No other signals were heard at either end, so far as is known.

News of this got around fast, and the 50-Mc. band was loaded on the morning of the 22nd, a holiday in many quarters, but the cats watched the hole in vain that morning. There were mild bursts of aurora on the evening of the 21st and 22nd, and a more pronounced one early in the evening of the 23rd, setting the stage for another South American session on the morning of the 24th.

This one was it! The 10-meter band opened with a rush, signals from the South Americans building up to exceptionally high peaks at 7:30, and then dropping off quickly again, in a manner reminiscent of the behavior of 10-meter signals from Europe in the early-morning hours of October and November, 1947, when 50-Mc. openings were a daily phenomenon across the North Atlantic path. Arrangements were made with LU9EV and HC2OT to check 50 Mc. regularly, beginning at 8:15 A.M.

The early start was unnecessary, however, as the signals of HC2OT broke through at 9:36, just one minute earlier than on the 21st. After a brief exchange, with very weak c.w. signals, we tuned up the band to find LU9EV calling frantically, and the first contact on 50 Mc. between the Buenos Aires area and W1 was on.[1] LU1BV was worked at 9:55 and LU8AQ at 10:12, the latter doing very nicely on about 50.6 Mc. The LU signals were peaking very strongly around 10:15, and HC2OT was booming through like a local. The South Americans found only a few U. S. stations active, however. HC2OT worked WØIPI, Olmitz, Kansas, for state No. 26, and WØOLY and WØJOL, both of Iowa, in addition to W1HDQ. LU9EV worked W1HDQ, W8CMS, WØOLY, and WØIPI, in that order, with WØIPI the last station to fade out, about 11:30 EST. W8MVG, Clio, Mich., reports reception of LUs 9EV, 1BV, and 9MA, with signals heard until 11:50 A.M.

Some interesting things have shown up as a result of the growth in 50-Mc. interest in the various countries of South America. Below the Equator, December and January are the seasonal equivalent of our June and July, yet these two months exhibited very little in the way of 50-Mc. openings. Through most of February, however, the 6-meter band was open practically every night for the 50-Mc. enthusiasts of Argentina. LU9EV reports 50-Mc. contacts with countries in the northern part of South America or with Central America on Feb. 6th, 8th and 10th through 20th. Stations worked included YV5AC, YV5AE, YV5BK, YV5BE, OA4AE, OA4BG, PY2QK, PY1LQ, and TI2AFC. HK1HQ was heard on two occasions.

This series of 2000- to 3000-mile openings was interrupted when the ionospheric disturbance broke in this hemisphere, and was not resumed until the night of the 24th. In fact, it appeared that the resumption of the evening openings coincided with the break-up of the 4-day disturbance in this hemisphere. On the night of the 24th, LU9EV worked TI2AFC, YV5AE, OA4AE, and XE1GE, and heard HC2OT. HC2OT worked TI2AFC, for country No. 13, and YV5AE. He heard YV1AU, apparently a newcomer. On the night of Feb. 25th, LU9EV worked PY2QK, YV5BE, HK1HQ (probably the first LU-HK 50-Mc. QSO), TI2AFC, YV5AE, OA4AE, and OA4BG. Contacts with these areas

* V.H.F. Editor, *QST*.

[1] Previous W1–LU contacts were with LU9MA, Mendoza, some 600 miles west of Buenos Aires, in Oct., 1949.

were repeated on the 26th and 27th. HK1CA and YV1AC were heard also on the 26th and 27th. HC2OT made the first HK-HC 50-Mc. contact (for country No. 14) on the 26th, and also worked TI2AFC, XE1GE and YV5AE.

The evening openings occur regularly, the band opening at almost the same time each evening, around 7:30 to 7:45 P.M. EST. On the better evenings the signals stay in until 10:30 or so, and they are often of good strength, though frequently exhibiting considerable flutter. Since there is no evidence of high F_2-layer m.u.f. at such hours we assume that the E layer is responsible, but the nature of these nightly openings bears little resemblance to the sporadic-E openings of our summer months. The only similarity noted was that when CE1AH was active she was able to hear and work the LUs over the 850-mile path to the Buenos Aires area, a typical sporadic-E distance. But when did Ws ever find it possible to work distances of 2000 to 3000 miles night after night for two months at a time, in two periods each year!

And what of these 5000-mile chances we, in the northern part of the United States, are getting immediately following the aurora outbreaks? The F_2-layer charts indicate an m.u.f. of about 34 to 36 Mc. for W1 to HC and LU, though the time that the charts say m.u.f. is highest checks closely with actual experience. For more than a year now we have demonstrated the likelihood of 50-Mc. openings following auroral peaks, during the September-November and February-April periods, the time of day having always been close to 10 A.M. local time. Whether these opportunities will continue through the lower phases of the solar cycle now approaching is an enigma that 50-Mc. men should find considerable interest in solving. Can we work South America in the evening hours, too? And what of the Lima, Peru, contingent — why have they not come through along with HC2OT and the LUs? We have plenty to find out yet about the 50-Mc. DX business!

Around the World on the V.H.F. Bands

Wiesbaden, Germany — DL4CK (W6YHI) had to go half way around the world to get a location not surrounded by hills, but he is now set up for business on 144 Mc. in a fine spot in Wiesbaden, where DL4XS and DL4SJ are also active on 144 Mc. There are also a dozen or more German hams on 144 Mc., with only one of them not crystal-controlled. DL4XS has assisted nearly all the Germans in getting started on 2, and relations have been greatly improved thereby. There are also about 15 stations in and around Heidelberg, and some activity is in prospect in the French Zone, when and if licensing arrangements are completed. DL4XS has been heard in England on frequent occasions, and all the gang have high hopes of doing two-way work over much of Europe this spring and summer. For sked arrangements, write WQJG John P. Drummond, Hq. 1807 AACS Wing, APO 633, % Postmaster, New York. The Wiesbaden net frequency is 144.6 Mc.

Note from W1RWS, at the DXCC desk: 6 of the cards submitted by PAØPN for DXCC are for v.h.f. contacts — ON4FG, G2ADZ, F8OL, DL3FM and PAØCB on 144 Mc., and ZB1AC on 58 Mc.

Arlington, Mass. — Tired of the frequent necessity for beam turning in the Sunday-night sessions on 220 Mc., W1CTW put up a 4-section collinear vertical, replacing his 8-element double Yagi. The new fixed system is outdoors and higher than the indoor beam, and it performs as well as the latter in every direction; better in some. Lots of parasitic elements are no great help in arrays for the higher v.h.f. bands in many cases, to say nothing of their deficiencies in round-table work. Cal reminds us that here is where vertical polarization pays off, too!

Collierville, Tenn. — The possibility of the first Tennessee-Texas 144-Mc. contact looms as a result of the first contact between W4HHK and W5DXB, Vivian, La., on Feb. 10th. During a QSO with W4HHK, W5JTI, Jackson, Miss. called W5DXB on the landline to arrange a try on 144 Mc., and contact was established at 10:23 P.M. Though the distance is about 260 miles, Paul believes that contact can be made under any but the most adverse conditions. Vivian is in the northwestern corner of Louisiana, only a few miles from the Texas line. Any candidates across the border?

Oil City, La. — The local activity in the Shreveport area has shifted from 6 to 2 meters, according to W5ML. Art says that W5s DXB, JTR, NXM, and ML are on right along, with JFF, DC, and KKI coming on soon. On Feb. 7th W5ML worked W5FXC, Houston, and W5ONS, Victoria, Texas, and heard several more at about 250 miles.

Halifax, Nova Scotia — One reason you don't hear VE1QZ too much on the cold nights is the shack temperature; during the aurora openings on the 20th–23rd, the coldest nights of the winter, Oscar was doing the best he could to keep going on 50 Mc., but operating in a room temperature of about 20 degrees is no great fun. So if you hear what sounds like automatic transmission some cold night, that's what it is, with the operator dashing out for a look over the band now and then. If you can't raise him, at least send along a heard report!

Lakeview, Ontario — Want a more readable signal on aurora openings? Try tone modulation along *with* c.w. Tests made by VE3ANY in a 50-Mc. aurora QSO with W1HDQ indicate that the tone modulation really helps. It is probably no more than a comparable increase in transmitter power, with straight c.w., but a definite improvement in readability does occur when the tone is added. Gordon's unmodulated c.w. was about the same strength as other VE3s, but with the tone added he really stood out. But don't use tone modulation *without* carrier keying; it simply is no good, unless conditions are such that voice is also readable.

Perryville, Mo. — For a long time the only 2-meter contact available to WØQMF has been WØPLJ, at Jackson, some 30 miles to the southeast. The St. Louis 2-meter net activities have been heard regularly in Perryville, but

One of South America's outstanding 50-Mc. stations, CE1AH, Chuquicamata, Chile, with Ida, CE1AJ at the operating position. Off the air while its operators are on a visit in this country, CE1AH will be back in business in April.

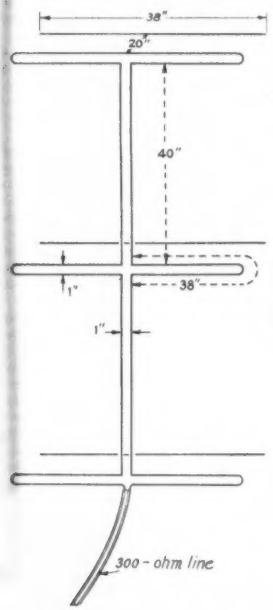
WØQMF had been unable to break in until he sent word to the St. Louis gang that they were being heard down there.

WØPLJ was able to work W9s VZM, HAB, FMY, and FVJ, and WØKYF and WØIHD in the V.H.F. SS, and he hopes that this will help to make possible more regular contacts on 144 Mc. WØQMF and WØPLJ continue their skeds, and would be glad to hear from other 2-meter operators who would like to join them.

San Bernardino, Calif. — Height above ground isn't always helpful. W6MVK writes that the 16-element 2-meter array used by W6QUK is only 15 feet off ground. He aims east and bounces the signal off the mountains to work into Los Angeles. Raising the antenna higher results in reduced signal strength. Tom also passes along the information that W6VNL is using a rotatable stacked rhombic with good results. So long as low power is used, terminating resistors are no problem. The front-to-back ratio is at least as good as with parasitic beams, and the broadband characteristics are very helpful.

A Low-Cost 2-Meter Beam

The 2-meter array shown below was built by Warren Hill, W9LJP, in an effort to come up with a low-cost job that anyone could build. He calls it "The 60-er" because that figure represents its total cost (yes, cents!), the only purchased material being some aluminum clothesline. Its driven section consists of three folded dipoles, stacked a half wave apart, and fed at the bottom with 300-ohm line. It may be used with or without reflectors, though the performance is greatly improved when reflectors are added.



A low-cost stacked array for 144 Mc., built by W9LJP.

Each half of the folded dipoles is 38 inches total length, and the entire driven portion of the array may be made from a single piece of wire. The frame is of wood, with the wire mounted on small blocks of polystyrene separated from the frame by small stand-off insulators. The dipoles are 40 inches apart. Reflectors are spaced a quarter wavelength (20 inches) in back of the driven elements.

Only three sections have been used to date, but Warren is going to try stacking up to six sections in the near future. With three, the power in each dipole seems about the same. Going to greater numbers of driven elements may make it necessary to feed the system at its center to achieve current balance and optimum performance.

Final Results — 3rd Annual V.H.F. Sweepstakes

Right from the start, the V.H.F. SS idea caught on. The first one, held in January, 1948, set a record for a v.h.f. activity. The 1950 edition was more than double the size of the first; the final tabulation showing just short of 400 entries. This establishes the V.H.F. Sweepstakes as one of the most popular operating activities on the ARRL schedule, bowing only to the Field Day, the regular Sweepstakes, and the DX Contest in the number of participants.

Much of the credit for the large turnout must be given to certain club groups whose organization work resulted in many new calls appearing on our v.h.f. bands. Some 19 clubs were mentioned by participants, and the work done by the Amateur V.H.F. Institute of New York, the York Road Radio Club, the South Jersey Amateur Radio Association, the Frankford Radio Club, and the Midwest V.H.F. Club was outstanding. Each of these spared no effort to make sure that every possible member was active in the contest, and that his report, however small, was forwarded to Headquarters.

As might be expected, individual scores topped all previous records. Once again, the V.H.F. SS demonstrated that plenty of contacts can be made on our v.h.f. bands, without appreciable help in the form of favorable conditions. No openings were reported in any part of the country, yet hundreds of contacts were made over distances in excess of 100 miles on both 50 and 144 Mc.

The largest number of QSOs ever recorded in a v.h.f. contest was turned in by W2SAI, Riverton, N. J. Using 829 rigs on both bands, W2SAI handed out 228 numbers on 50 and 144 Mc. to stations in 9 sections, for a score of 4104 points. Second in this category was his fellow-member in the Frankford Radio Club, W3BES, Glenside, Pa., who had 212 contacts in 8 sections, for 3384 points. W3KKN, Willow Grove, Pa., gave Jerry a close run for the Eastern Pennsylvania Section award, finishing just two contacts behind W3BES. The Eastern Pennsylvania Section, center of some of the keenest club competition, leads all other sections in number of reports turned in: 52. Southern New Jersey was second with 42.

There were some fine one-band scores, particularly on 144 Mc. Top man in this department was W2BV, Minotola, N. J., with 171 contacts in 10 sections for a score of 3420, an all-time one-band record, and second-highest score in the country. W2LVQ, New York City, was only one QSO behind, with 170 different stations worked on 144 Mc. and top place in the highly-competitive N.Y.C.-L.I. Section.

As might be expected, since they have the heaviest population concentrations to draw from, the W2s and W3s had the highest scores but the turnout in other sections, some not too well represented in previous contests, was most gratifying. As she has done before, Margaret Roberts, W8BFQ, Everett, Ohio, ran up one of the best inland scores, with 68 contacts in 8 sections, for 1088 points. W9TKL, Waukegan, Ill., covered his territory thoroughly, racking up 72 contacts in 4 sections (in an area where sections don't come as easy as on the Atlantic Seaboard) for the top score in the Illinois Section.

An intensive campaign by the Midwest V.H.F. Club was the principal factor in the fine representation in W9. The Rochester V.H.F. Group stirred things up in Western New York. Activity in Southern California was sparked by the Two Meters and Down Club, by sponsoring a local competition, with prizes won by W6NGN, with 124 stations worked, W6BHG with 112, and W6WKO with 100, all on 144 Mc. At least two portable set-ups provided hard-to-get sections. W3KWF/8 provided West Virginia for 40 lucky 144-Mc. men, and W2PCQ took his mobile set-up over into Western New York to give the gang a break. Ice storms and high winds took a heavy antenna toll in the Toronto area just before the contest, but there are 15 VE3s in the box score. Several of them did some fast antenna work to get back in business.

We've heard reports of unsportsmanlike tactics being used in some localities, but almost everyone reported a swell time, and the best contest ever. One thing is certain: v.h.f. activity hit an all-time high over that week end. The problem now is to encourage the many recruits brought to the v.h.f. bands to stay there. V.h.f. contests are sponsored in order to provide a week end of fun for everyone; to increase activity and develop new friendships on our v.h.f. bands. Let's keep our eyes on these objectives, and so conduct ourselves in contests and at other times that these high aims are served.

The complete tabulation of individual scores follows, arranged by ARRL divisions and sections. The final checking of club scores had not been completed as we go to press; the gavel winner and club standings will be announced next month. The columns give the total point score, the number of contacts made, the number of ARRL sections worked, and the bands used — A for 50, B 144, C 220, and D 420 Mc.

ATLANTIC DIVISION

Md.-Del.-D. C.

Eastern Pennsylvania

W3BES	3384-212- 8-A-B	W3JDP	996- 83- 6-B
W3KKN	3360-210- 8-A-B	W3CGV	952- 68- 7-A-B
W3MFY	2720-170- 8-A-B	W3LMC	672- 56- 6-B
W3LTU	2576-184- 7-A-B	W3IZL	400- 50- 4-A-B
W3OWA	2240-140- 8-A-B	W3PRB	400- 50- 4-A-B
W3UKI	2016-126- 8-A-B	W3NZR/3	220- 22- 5-A-B
W3FZQ	1968-142- 7-A-B	W3HB	150- 25- 3-B
W3FXG	1960-140- 7-A-B	W3AHQ	66- 11- 3-B
W3KT	1932-138- 7-A-B	W3KFK/3	48- 12- 2-B
W3LVF	1792-128- 7-A-B	W3NQC	24- 6- 2-B
W3KIW	1568-112- 7-A-B	W3NH	8- 4- 1-B
W3HFD	1554-111- 7-A-B		
W3NXT	1554-111- 7-B		
W3CTJ	1140-114- 5-A-B		
W3OXQ	980- 70- 7-B		
W3OQG	850- 85- 5-A-B		
W3FSC	840- 84- 5-B		
W3NSI	840- 70- 6-B		
W3GHM	816-102- 4-A-B		
W3KBH	800- 80- 5-A-B		
W3GRY	770- 77- 5-A-B		
W3MZM	760- 76- 5-B		
W3HRD	582- 97- 3-A-B		
W3GHS	510- 51- 5-B		
W3MJB	450- 75- 3-B		
W3IXN	444- 74- 3-A-B		
W3FUF	420- 70- 3-A-B		
W3KDH	400- 50- 4-B		
W3JPP	306- 51- 3-B		
W3GYV	285- 48- 3-A-B		
W3NKD	240- 60- 2-B		
W3BYB	228- 57- 2-B		
W3ISE/3	228- 38- 3-B		
W3EVW	198- 33- 3-A		
W3IU	198- 33- 3-A		
W2PML/3	192- 32- 3-B		
W3ED	188- 47- 2-B		
W3JPI	172- 43- 2-B		
W3BXE/3	168- 42- 2-A-B		
W3OGB	152- 38- 2-B		
W3MQC	126- 21- 3-B		
W3QAS	124- 31- 2-B		
W3TF	112- 28- 2-B		
W3IMV	104- 26- 2-B		
W3HVB	92- 23- 2-B		
W3CPV	84- 21- 2-A-B		
W3OCU	84- 9- 3-B		
W3SPF	52- 13- 2-B		
W3GEJ	2- 1- 1-B		
W3MQU (W3LZG)			
	2320-145- 8-A-B		
W3BWQ (W3s AFJ ETM)			
	2080-130- 8-A-B		
W3CXU (W3ALB)			
	1393-100- 7-A-B		

Southern New Jersey

W2SAI	4104-228- 9-A-B
W2BV	3420-171-10-B
W2PAU	3276-182- 9-A-B
W2PWP	2368-148- 8-A-B-D
W2ADA	2064-130- 8-A-B
W2QED	1968-123- 8-B
W2MEU	1782- 99- 9-A-B
W2QVH	1776-111- 8-A-B
W2JAV	1610-115- 7-B
W2REB	1212-102- 6-B
W2BDI	1190- 85- 7-B
W2DAJ	1078- 77- 7-B
W2SDO	1036- 74- 7-B
W2GQO	972- 81- 6-B
W2FXN	875- 88- 5-B
W2PFQ	864- 72- 6-B
W2VX	850- 85- 5-B
W2UCV	608- 76- 4-B
W2EH	546- 39- 7-B
W2BAY	480- 40- 6-A
W2AXA/2	432- 54- 4-B
W2OSV	416- 52- 4-B
W2EET	400- 50- 4-A-B
W2KHW	400- 50- 4-B
W2RBF	324- 54- 3-B
W2TM	320- 32- 5-B
W2WGH	288- 48- 3-B
W2LY	216- 36- 3-B
W2ASG	204- 34- 3-B
W2TJX	192- 32- 3-B
W2APB	180- 30- 3-B
W2UNT	150- 25- 3-B
W2BBW	144- 24- 3-B
W2RQI	124- 16- 4-B
W2DMU	96- 16- 3-A-B
W2FHY	90- 15- 3-B
W2ABQ	84- 14- 3-B
W2RUA	84- 14- 3-A
W2OQN	76- 19- 2-B
W2SPV	56- 14- 2-B
W2JRO	10- 5- 1-D
W2WUP	10- 5- 1-D
W2OQS	8- 4- 1-D
W2ZNB	8- 4- 1-D

Western New York

W2QNA	480- 60- 4-A-B
W2KZ	384- 48- 4-B
W2QZU	376- 47- 4-B
W2SSS	256- 32- 4-B
W2ORI	228- 38- 3-B
W2RUC	150- 25- 3-B-D
W2VLL	148- 37- 2-A-B
W2ZUX	132- 33- 2-B
W2UTH	120- 30- 2-B
W2PTC/2	80- 20- 2-B
W2NES	76- 19- 2-B
W2ZRC	72- 18- 2-B
W2UXP	64- 16- 2-B
W2VZL/2	38- 19- 1-B
W2UAD	28- 14- 1-B
W2SJV	26- 13- 1-B
W2BCL	20- 10- 1-B
W2QY	20- 10- 1-B
W2ZHB	20- 10- 1-B
W2QIL/2	14- 7- 1-B
W2SD	12- 6- 1-B
W2UYS	12- 6- 1-B
W2PSD	4- 2- 1-B

W. Pennsylvania

W3LNA	126- 21- 3-B
W3GEG	84- 21- 2-B
W3CJF	76- 19- 2-B
W3MQW	68- 17- 2-B
W3QCN	56- 14- 2 —
W3KWH (W3s LBE NKM OKU RXI UHM)	174- 29- 3-A-B

CENTRAL DIVISION

Illinois

W9TKL	576- 72- 4-B
W9CGR	462- 77- 3-A-B
W9VX	450- 75- 3-A-B-D
W9FVJ	420- 43- 5-B
W9NW	390- 65- 3-B
W9OBW	378- 63- 3-A-B
W9NFK	366- 61- 3-B
W9KCW	300- 50- 3-B
W9CZR	270- 45- 3-B
W9RTY	252- 42- 3-B
W9PEN	234- 39- 3-B
W9AQP	210- 35- 3-B
W9YWS	183- 31- 3-B
W9BHH	140- 35- 2-A-B
W9HXS	136- 34- 2-B-D
W9QJO	104- 26- 2-B
W9KJU	100- 25- 2-B
W9WIO	96- 24- 2-B
W9AYM	72- 18- 2-B
W9HKO	48- 24- 1-A-B
W9BYG	42- 21- 1-B
W9ZYF	40- 20- 1-B
W9MMV	32- 16- 1-A-B
W9NVG	30- 15- 1-B
W9GIC (W9ZSI)	46- 23- 1-B

Indiana

W9ZHL	380- 38- 5-A-B
W9EWO	272- 34- 4-B
W9NSF	240- 30- 4-B
W9JMS	159- 27- 3-A-B
W9GLW	128- 16- 4-B
W9UIA	54- 9- 3-A-B-D
W9DGA	4- 2- 1-A-B

Wisconsin

W9DKU	201- 34- 3-B
W9LJV	186- 31- 3-B
W9UJM	174- 29- 3-B
W9TQ	168- 28- 3-B
W9JPK	102- 17- 3-B
W9BTI	96- 24- 2-B
W9PYM	78- 13- 3-B
W9AFT	68- 17- 2-B
W9DYZ	64- 16- 2-B
W9GJE	52- 13- 2-B
W9AVF	28- 14- 1-B
W9BTQ	20- 10- 1-B
W9WTL	18- 9- 1-B
W9FES	12- 6- 1-B
W9DDG	8- 4- 1-B

DAKOTA DIVISION

Minnesota

W9TKX	6- 3- 1-A

DELTA DIVISION

Louisiana

W5MKP	84- 11- 4-B

Tennessee

W4HHK	33- 6- 3-B

GREAT LAKES DIVISION

Kentucky

W4MKJ	144- 18- 4-B
W4JDN	120- 20- 3-B

Michigan

W8NNF	275- 28- 5-A-B
W8RWW	200- 25- 4-B
W8DIV	84- 14- 3-B
W8UMI	69- 12- 3-B

Ohio

W8BFQ	1088- 68- 8-B
W8WSE	564- 47- 6-A-B
W8VOZ	51- 9- 3-A-B
W8MGA	32- 8- 2-B
W8LBH	28- 14- 1-A-C-D

HUDSON DIVISION

Eastern New York

W2PCQ	828- 46- 9-B
W2RH	450- 45- 5-B
W2ELD	328- 41- 4-B
W2YVG	312- 39- 4-B
W2IP	280- 35- 4-B
W2BVU	245- 25- 5-B
W2ACY	96- 16- 3-B
W2PNQ	96- 16- 3-B
W2YXE	68- 17- 2-B
W2WHX	40- 10- 2-B

N.Y.C.-L.I.

W2LVQ	2720-170- 8-B
W2FHJ	2548-182- 7-A-B
W2SVI	1750-125- 7-B
W2YKG	1449-104- 7-B
W2NPJ	1442-103- 7-B
W2QHZ	1400-100- 7-B
W2AOD	1326-111- 6-B
W2KTU	1152- 96- 6-B
W2YKM	1120- 80- 7-B
W2OHE	1104- 92- 6-B
W2BEV	1032- 86- 6-B
W2DHB	984- 82- 6-B
W2BWH/2	966- 81- 6-B
W2KU	880- 88- 5-B
W2TZU	850- 85- 5-A-B
W2ZSO	736- 92- 4-B
W2CET	660- 66- 5-B
W2LKP	660- 66- 5-B

W2N8D	612- 51- 6-A-B	
W2ZNZ	540- 54- 5-B	
W2IH	516- 43- 6-B	
W2ZPG	500- 50- 5-B	
W2WWN	488- 61- 4-B	
W2YZI	480- 60- 4-B	
W2AUF	450- 45- 5-B	
W2PQG	440- 55- 4-B	
W2WCR	420- 35- 6-B	
W2IN	408- 51- 4-B	
W2ZUC	324- 27- 6-B	
W2AFR	296- 37- 4-B	
W2JSV	276- 46- 3-B	
W2FO	256- 32- 4-B	
W2NFU	240- 30- 4-B	
W2NDK	234- 39- 3-B	
W2WOK	222- 37- 3-B	
W2NZJ	174- 29- 3-B	
W2LRU	160- 40- 2-B	
W2JBQ	146- 37- 2-B	
W2OG	144- 24- 3-B	
W2AWH	102- 18- 3-B	
W2JNB	100- 25- 2-B	
W2TUK	44- 11- 2-B	
W2QQD	40- 10- 2-B	
W2LGK	36- 18- 1-B	
W2AVI	34- 17- 1-B	
W2CD	24- 6- 2-B	
W2AOT	20- 10- 1-B	
W2PGZ	20- 5- 2-B	
W2DKH	2- 1- 1-B	
W2ZUH	2- 1- 1- —	

Northern New Jersey

W2DFV	2616-164- 8-B
W2ZBO	1946-139- 7-B
W2PIX	1692-141- 6-B
W2SGV	1350- 75- 9-A-B
W2PJA	1098- 92- 6-B
W2DZR	912- 76- 6-B
K2BC	888- 74- 6-B
W2AMJ	882- 49- 9-A
W2DZA	840- 71- 6-A-B-C
W2YPE/2	650- 65- 5-B
W2BTZ	360- 45- 4-B
W2CXE	315- 23- 7-A
W2UWN	246- 41- 3-B
W2MPP	108- 18- 3-B
W2ULS	52- 13- 2-B
W2CCC (W2CBB)	590- 59- 5-B

MIDWEST DIVISION

Missouri

W9IHD	48- 8- 3-B
W9MCX	12- 3- 2-B

NEW ENGLAND DIVISION

Connecticut

W1HDQ[1]	2134- 97-11-A-B-D
W1JKC	1809-101- 9-B
W1REZ	1040- 65- 8-B
W1HDF	972- 54- 9-A-B-D
W1PNB	826- 59- 7-A-B-D
W1PEA	480- 40- 6-B
W1MPO	384- 32- 6-A-B
W1FTX[1]	378- 27- 7-A-B
W1ICP[1] (W1RWS)	344- 43- 4-A-B
W1QBH	210- 35- 3-A-B
W1KHM	108- 27- 2-B
W1BDI[1]	86- 22- 2-A-B
W1PHR	76- 19- 2-B
W1RGM	72- 18- 2-B
W1ON	48- 6- 4-A
W1ASJ	44- 11- 2-B
W1CEG[1]	44- 11- 2-A
W1QUV	40- 10- 2-B
W1RUR	34- 9- 2-B
W1FWH[1]	26- 13- 1-B

Maine

W1EIO	81- 14- 3-A-B

Eastern Massachusetts

W1ATP	2100-105-10-A-B
W1SNK	900- 90- 5-A-B
W1MON	805- 81- 5-B
W1CTW	800- 80- 5-A-B-C
W1MBS	504- 84- 3-B
W1DJ	384- 32- 6-A
W1JLI	360- 60- 3-B
W1MCR	360- 60- 3-B
W1MUD	360- 60- 3-B
W1CPB	294- 49- 3-B
W1IHL	288- 48- 3-B
W1HIL	258- 43- 3-A-B
W1CTR/1	252- 63- 2-B
W1AQE	212- 53- 2-B
W1RUU	198- 33- 3-B
W1PLX	144- 24- 3-B
W1CK	130- 13- 5-A
W1OTH	104- 26- 2-B
W1MHC	96- 16- 3-A-B
W1QOI	72- 36- 1-B
W1HLX	36- 18- 1-B
W1QFO	28- 14- 1-B

Western Massachusetts

W1QXE	780- 65- 6-A-B
W1RO	720- 45- 8-A
W1RFU	408- 34- 6-A-B
W1DRF	280- 35- 4-B
W1CCH	171- 29- 3-B
W1MNG	96- 24- 2-A-B
W1NLE	70- 18- 2-B

New Hampshire

W1LSN	528- 44- 6-A-B
W1FZ	192- 24- 4-A-B-C-D

Vermont

W1MEP	24- 6- 2-B

NORTHWESTERN DIVISION

Washington

W7MIG	28- 14- 1-A-B
W7FIM	14- 7- 1-A-B
W7RT	6- 3- 1-B
W7KNV	4- 2- 1-B

PACIFIC DIVISION

Hawaii

KH6OV	6- 3- 1-A
KH6PP	6- 3- 1-A
KH6PS	6- 3- 1-A

Santa Clara Valley

W6GCG	795- 81- 5-A-B-D
W6ZBS	700- 70- 5-A-B-D
W6EEX	260- 26- 5-B
W6OIA	250- 25- 5-B
W6YHL	180- 18- 5-B
W6BPV	66- 11- 3-B

East Bay

W6AJF	625- 63- 5-A-B-C-D
W6BLA	63- 11- 3-B

San Francisco

W6BUR	590- 59- 5-A-B
W6CDT	450- 45- 5-B
W6PSY	350- 35- 5-B

Sacramento Valley

W6YLO	520- 52- 5-B
W6BVK	384- 48- 4-A-B

San Joaquin Valley

W6FYM	420- 42- 5-A-B
W6GQZ	300- 30- 5-A-B
W6EXH	260- 26- 5-A-B
W6VKD	168- 21- 4-A-B

ROANOKE DIVISION

Virginia

W4AO	1113- 80- 7-B
W4LVA	696- 58- 6-A-B
W4KYY	490- 49- 5-B
W4JUY	198- 33- 3-A-B
W4NQR	168- 28- 3-B
W4KFT	24- 6- 2-B

West Virginia

W3KWF/8 (W3PZK PGG)	320- 40- 4-B

SOUTHEASTERN DIVISION

Georgia

W4KIP	42- 16- 1-A-B-C
W4LRR	26- 13- 1-A-B

SOUTHWESTERN DIVISION

Los Angeles

W6BHG	448-112- 2-B
W6WKO	400-101- 2-B
W6HZ	280- 70- 2-A-B
W6MVK	268- 62- 2- —
W6ABN	242- 63-2-A-B-D
W6BWG	168- 45- 2-A-B

San Diego

W6NGN	494-124- 2-B

WEST GULF DIVISION

Southern Texas

W5FEK	80- 20- 2-B
W5DSB	28- 7- 2-B
W5IRP	26- 13- 1-B

CANADA

Maritime

VE1QZ	6- 3- 1-A-B
VE1BC	4- 2- 1-A-B
VE1PQ	2- 1- 1-A

Ontario

VE3AIB	392- 49- 4-B
VE3ANY	384- 64- 3-A-B
VE3ANT	344- 43- 4-B
VE3AQG	272- 34- 4-B
VE3BOW	272- 34- 4-B
VE3BUO	272- 34- 4-B
VE3BQN	228- 38- 3-B
VE3QT	216- 27- 4-B
VE3AJJ	172- 43- 2-A-B
VE3AZX	162- 27- 3-B
VE3UT	144- 24- 3-B
VE3TI	122- 31- 2-B
VE3BPB	120- 20- 3-B
VE3IZ	96- 24- 2-A-B
VE3KM	26- 13- 1-A-B

[1] Headquarters staff member — not eligible for award.

Progress of a Ham

Some years ago when I was a chap
With a crystal detector and a rotary gap,
A four-wire antenna, the longer the better;
When I used my initials (for I had no call letter).
I would tickle cat whiskers from daylight till dark
Just to hear from 'cross town the sound of a spark.

I built a loose coupler and spent lots of jack
For plate-glass condensers to make the spark crack
I then got a license that gave me a call,
My tickets were plastered all over the wall.
I sat up all night just so I could say
That I worked a town only a few miles away.

I purchased an audion, put the crystals to rest,
And it didn't take long to prove they were best.
It would make signals louder, as well as detect,
In fact it was better in every respect.
I still sat up late but then I could boast
That I worked a guy way out on the Coast.

Equipment got better, I couldn't see the end,
By this time we found that with tubes we could send.
The distance, it seemed, got greater and greater,
And I was sitting up later and later.
I sat up all night; with the new tubes' assistance
I was able to reach to a very great distance.

I now work ten meters, c.w. and 'phone,
I listen all night for a voice or a tone.
I don't try for DX, Australia and such,
That's getting too common, I hear it too much.
I sit up all night (Oh! boy what a drip),
To hear Ol' Milwaukee come through on short skip.

— G. E. Hoffstetter, W9JC

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

Sleet storms, sunspot symptoms, rare DX (with a dash of QRM) — the 16th ARRL DX Competition had just about everything thrown in but the kitchen sink. And one W4 says his XYL threw even *that* at him.

W1RWS and colleagues have their Hq. desks reinforced for the sharp rise in DXCC aspirations all around and QSL managers are already paying a heavy price in toil as card circulation reaches its yearly peak.

One quick listen across twenty as festivities reached a climax led W8YGR to surmise that amateur radio must have at last reached the age of nuclear-fission finals, turbo-jet beam rotators, and pressurized shacks.

Quite possible. Indeed, we saw Jeeves throw down the 'phones wearing an expression of sheer horror not long after the contest began. He swears he kept hearing the c.w. kilowatt of one W1 draw in a deep breath just before it disappeared beneath each pile-up.

Well, we trust no one else cracked under the strain but there's no question that the going did get rough. We're still worrying about the Nevada W7 who couldn't take it any longer and was later heard trying to work himself the long way 'round for WAS.

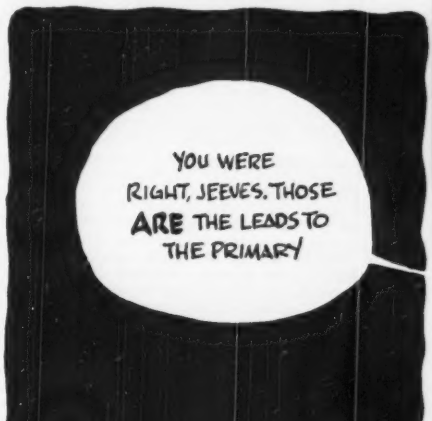
Yet, DX appetites are almost above satisfying; perchance below you'll uncover a crust or crumb over which to drool. . . .

What:

During January and February, trans-Atlantic conditions appeared intermittently good on *one-sixty* with activity centered on week ends. Gs 2PL, 2YS, 3FAB, 5JU, 6BQ, 6GM, 8NF, GD3UB, GM8UM and EK1AO have been well heard on our side and W1BB lists in addition the following who are known to be on and trying: Gs 2FLK, 2GF, 2JF, 2JH, 3BOF, 3BTP, 3DOX, 3KP, 3ZP, 4CB, 6AB, 6AT, 6LB, GM8FM, GW8WJ, DL2DV, EI3ET, OKs 1AA, 1AE, 1AM, 1AWA, 1CA, 1HB, 2OL, HZ1KE and PY7WS . . . . . KV4AA is also quite active on the band. Most of this activity is c.w., of course, but 'phone two ways have clicked during peak periods . . . . . W4NNN, who has his share of the l.f. DX collected, rigged himself a balloon-supported 1.8-Mc. half-wave skywire but the band failed to open properly in this instance and just **KV4AA** (1995) was worked . . . . . Among the many North American participants in this department are W1s EFM, OE, PLO, W3s IU, LII, W4NNN and VE1EA plus, of course, W1BB who is a student of 160-meter propagation of long standing. In fact, W1BB has gear to hit just about every band assigned to amateurs, including much of Ed Tilton's stamping grounds.

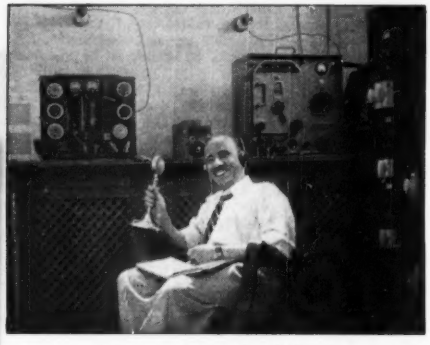
ZL1CI gives us some pitch on the *eighty* proceedings Down Under and has QSOs listed with TG9RB, FA8s BG, JO, VE1s BV, RF, KV4AA, VR2s BC, BM, BR, BU, VR5PK and VK9RH. The latter is raising input to 70 watts and intends to increase his W coverage therewith. Claude notes that VK5KO's 40th postwar 3.5-Mc. country was donated by VR2BM. ZL1CI is still in pursuit of EK1AO, MP4BAD, VP5BF and FM8AD . . . . . W1KRV wound up a CD Party by QSOing ZLs 1OW, 3GU, 3NE and 3NH in quick succession and W2QHH made it 65 80-meter countries with CN8ET (VFO), OH2NB (VFO), **FM8AD** (3513) and **YS1ZK** (3515) . . . . . **VP5AR** has installed a modulator and will try some 3840-kc. 'phone, says W4ONX who now has 30 countries on this band through the recent addition of DL5AA, MI3SC, SP1CM, VP9XA and KS4AC . . . . . W1YA, with W1QIQ at the switches, ran into namesake DL1YA among a logful of Europeans, as well as **TA3GVU** (3507), **ZL1CI** (3515), **KV4AA** (3518), and **SVØWH** (3531). Lee speaks of the receiving being done with an SX-9 inhaler, vintage of 1933 or thereabouts, so the boys at the University of Maine are quite adept at getting the most out of receivers! (No remarks about our catwhisker job, either, Jeeves) . . . . . W5FXN caught up with ZSs 5YF and 6DW while W9DKH took out time from traffic work to sample ZL1BY and assorted Europeans . . . . . W2ESO is back on seeking Asia after a year's layoff and W9AND is up to 35 3.5-Mc. countries, recently adding **TG9RB** (3515) and **W1UB/KL7** (3520) . . . . . JA9FM has been completing WACs on the low edge and VE1EA was TA3FAS's first North American QSO on 80. . . . . W2WC has VP5s BD, BF, VP9BN, CT3AB and HA48A freshly logged.

The West Coast hasn't had much of a break on Europeans this season on *forty* and W7VY was surprised to work DL1DX, G3BHQ and OK1VY around 0800 local time one morning. Gene also snagged CR7BY, PK1SW, VS1CW, UAØFK and ZSs 1BK, 5BK, 5FY, 5OE and 6EV . . . . . "Just bought a 103 × 355 foot plot with lots of 60-foot pine trees on it," writes W4CJS. Competition gets tougher all the time! Warren's present QTH, nevertheless, was good for FA8BG, **FA9RZ** (7060), **LA7Y** (7006) and **VE8RK** (7075) . . . . . The indoor skywire of W2LCB gaffed a lengthy list of victims including CT1IT, SVØs WH, WJ, VQ4SC, ZS5EV and ZE2JN while W2WC preferred



* DX Editor, *QST*. Please mail reports of DX activity to W9BRD's home QTH: 1517 Fargo Ave., Chicago 26, Ill.

YO3RF, EK1TY, EA6AF and UB5BK . . . . . W5DF discovered that his vertical 3-element beam exhibits considerable gain and directivity on 40. (Because the 33-foot elements are tuned on 20 by tanks with one end directly grounded the job becomes a 3-element Marconi with very close spacing on 40 — neat trick!) Art's report gathering featured ZB1AJX, TA3GVU, CE4AD, VP6PV and sundry ZS folk . . . . . Consistent dial twirling by W6ZOL netted him a nice collection in **CR7BY** (7022), **HZ1KE** (7010) and **CT2AA** (7030), which three were heard, as well as contacts with **CE4AD** (7018), **PY2AFW** (7062), **VS2MI** (7050), VS6BK (now QRT), **KG6GM** (7040), **KR6CA** (7060), **JA3AF** (7030) and **JA4AI** (7050). This with a mere 70 watts. Roger has a new 7-Mc. half-wave vertical ready for production, too.



That familiar snappy fist and agile break-in so often heard on 14-Mc. c.w. belongs to the gentleman shown here, busily engaged in the pilot seat of EA8BC. (*Photo courtesy W9UOX*)

Twenty, a little more like its old self these warmer days, has had **FB8XX** (14,026) as the subject of much rapt attention. QSL via F8EX for this natty number, says W7VY who also captured ZSs 3R and 9D. If you haven't heard, FB8XX is on from the Kerguelen Isles, not Madagascar . . . . . GI5UR mentions **OX3BR** and **OX3UE** as being with a Danish expedition to Pearyland near the Pole (both near 14,080) and W5GEL uncorked a nice one in **YI3DYN** of Baghdad (14,030) . . . . . EA8BC (VFO), **CP1AQ** (14,020), **CR7IZ** (14,032), **I1NU**/Trieste (14,030), **UG6AB** (14,090), **UF6AC** (14,095), **HA5B** (14,092), **VQ2GW** (14,040), **VU2LK** (14,085), **TA3GVU** (14,090) and **YO2BU** (14,042) enhance the log of W9PVS while W5FXN surrounded KP6AB/KM6, **YS2RC** (14,063), KX6BA, VP5BF (VFO), **TF3MB** (14,013), **CT3AB** (14,015), **VP8AO** (14,001), **HL1BJ** (14,003), JA2CK and ZD8B betwixt stabs at 3.5-Mc. stuff . . . . . Time was when you could get a goodly bunch of DX men together and elicit a loud chorus of "Yes, We Have No Bahamas," but W8YGR knocked off three fast ones, VP7s NU, **NM** (14,115) and NN. W2COK, a long-time DX chaser, was heard slapping the bug from the latter during the DX Test. Gosh, these February-March jaunts to those pleasurable isles are getting to be quite an institution . . . . . KZ5WZ is quite enthralled by evening Asians, such as PK1HX, and notes that neighbor **HR2HZ** (14,050) sets the band a-hoppin' whenever he opens up with his 50-watter . . . . . W1CNU is back at it again and is struck by the absence of the many SUs that once inhabited 20. Ralph made off with **FF8JC** (14,000), **FE8AB** (14,020), **VP2FC** (14,010) and some OEs with his venerable 40-meter Zepp . . . . . W9AND counted **UP2KBC** (14,100) as Number 171 but missed **UO5KAA** near the same QRG while W8BRA knocked off the elusive CR1ØAA one morn . . . . . Rural antenna farms have their disadvantages says W9GMZ in recounting the trials and tribulations of maintaining a dairy herd near De Kalb, Ill. Paul found time to chat with OQ5DC (14,100), **ZB2I** (14,070), **ST2TC** (14,025), **ZE2KF** (14,125) and F9QV in Corsica. The latter functions on flea power so you may have to turn off grandpa's electric blanket to hear him . . . . . W4MR is a charter member of the "Society for Promotion of More C.W. Activity in ZS8" and recently managed **UAØs AA, AC, VS6s AC, JH, HS1SS** and CR9AG . . . . . W8WWU reached 138 with XZ2FK, CR6AI and YS2RC while W4CYY identified CT1HT as ex-CR4HT and VS1CW as ex-VK5SC. JB hears that AC3SQ QSLs are beginning to dribble through to fortunate parties.

That lair of rare 'phone DX, *ten*, is still producing results on a large scale. W2ZVS accepted some delicious offerings such as FFs 3CN, 8PG, KX6s BA, BH, KG6s FZ, GA, KJ6AF, KM6AO, KR6AS, VQ4s RF, N8H, ZDs 2S, 4AU, OQ5AO, HB1GS (Liechtenstein), CT2AE, TA3GVU, YK1AC and ZS3O . . . . . W8NOH added VP1BOY, SVØWB, OE7FR and VQ4ERR while W1RPC was collecting MT2BFC, MP4BAO, ZC6s JM, UNJ, KG6IE (Iwo Jima), ZE1JE, HZ1AB, VU2CQ and LX1CB . . . . . A homebrew artist of the old school, W3YCU secured his WAC diploma on 30 watts. The rig is self-constructed right down to the winding of the power transformers, a detail worthy of note in an era of handy supply houses and relatively inexpensive gear . . . . . FD3RG of French Togoland was giving 10 'phone a go according to VQ4ERR, and W9AND discovered some choice c.w. activity in SP5ZPZ (ex-SP8XA), CR4AC and GD3FOC.

Where:

The Chief Signal Officer in the U. S. zone of occupation in Germany desires that all QSLs bound for DL1 amateurs go via regular foreign mail. The German postal service is reported to be very good. This from W9TRD who has it that amateur licensing in said zone has been taken over by the Deutsch Post while DL4s were recently required to renew their tickets . . . . . Here's the address of the new QSL bureau for Alaska: ARRL KL7 QSL Bureau, Box 73, Douglas, Alaska . . . . . Now take a big drink of water and start licking stamps for the following:

CR7BY	Antonio L. Figueiredo, P. O. Box 276 DETA, Lourenco Marques, Mozambique
CT2AE	Santa Maria Airport, Santa Maria, Azores
EA8AN	J. R. S. Montero, 76 Triana St., Las Palmas, Canary Islands
EA9AI	Dr. A. Mora, Calle Ejercito Espanol, num 1, 1°, Melilla, Spanish Morocco
F9QV	Bonifacio, Corsica (France)
FF3CN	Box 566, Dakar, French West Africa
FF8AL	Box 566, Dakar, French West Africa
FF8JC	Box 566, Dakar, French West Africa
FK8AD	Louis Garbe, Aerodrome-LaTontouta, Nouvelle, New Caledonia
FM7WE	(ex-F9QU/FM8) P. O. Box 281, Fort-de-France, Martinique, F. W. I.
HP1GR	Carol Glickenhaus, Box 135, Panama City, Panama
JA2FM	Senior BOQ, FEAMCOM, APO 323, % PM, San Francisco, Calif.
JA2VC	Civ. HSG, FEAMCOM, APO 323, % PM, San Francisco, Calif.
KR6CA	APO 331, % PM, San Francisco, Calif.
LUØCW	(to LU7CW)
MD2AC	APO 231, % PM, New York City, N. Y.
MD2AF	APO 231, % PM, New York City, N. Y.
MD2AM	APO 231, % PM, New York City, N. Y.
MD2MD	APO 231, % PM, New York City, N. Y.
MT2BA	J. W. Bull, British Forces Broadcasting, Tripolitania
MT2BFC	% BOAC, Tripolitania
MT2JT	% BOAC, Tripolitania
MT2PW	% BOAC, Tripolitania
OQ5NK	P. O. Box 86, Leopoldville, Belgian Congo
PK2ZZ	(via VK7LZ)
YP8MC	A. L. Pereira da Costa, Rua Rodrigues, Fernandes 176, Sao Luiz, Maranhao, Brazil

VP6DG	Dean Goddard, Lower Bay Street, Bridgetown, Barbados, B. W. I.
VP7NM	Box 362, Nassau, Bahamas, B. W. I.
VP7NN	(via W2ZK)
VQ1CUR	(to VQ4CUR)
VS2MI	(via VS2AA)
VT1RF	R. B. Fuqua, Kuwait Oil Co. Ltd., Kuwait, Persian Gulf
W6ABL/KL7	APO 948, % PM, Seattle, Wash.
YI3DYN	(via RSGB)
3V8AP	M. Limant, 77 via Rue Courbet, Tunis P. O. 155, Tunisia

With no necessity for long white beards, W1s CNU, NLM, ODW; W2s CJX, ZVS; W4PJU; W5s AJG, FXN, GEL; W6ZOL; W8s CXN, DAW, WWU, YGR; W9s CFT, GMZ, UBP; MT2E — all played Santa Claus on this deal.

Tidbits:

That Galapagos expedition is about to come off at any time now. Quoting one of the planners, HC2JR: "We shall be leaving Guayaquil April 3rd and may operate maritime mobile on the way out if the Navy gives us permission. In any case, we expect to be on the air in Galapagos on April 7th. We shall operate around 28,450 kc. and 14,150 kc. There is just a possibility that the expedition will divide into two groups which means that we would be on the air by March 17th. . . . We are going to operate as HC8GRC." Better get your modulators functioning as John also remarks that the two 32V1 rigs may not see much c.w. operation . . . . When Italy resumes administration in Somalia, W9TRD opines, the place will be much more difficult to work — temporarily, at least — since presently-active MD4GC, MD4TH, and MS4FM will be QRT. MS4A is the sole Italian national now active. MD4GC has been serving as controller of posts and telegraphs there for some time . . . . Those LU8s mentioned previously turned out to be portable-mobile authorizations, still quite rare on the higher frequencies . . . . W5LFM just became good DX in the person of JA2FM and has a Stancor ST202A 100-watter warming up portions of 10, 20 and 40 c.w. KH6VC is newly-licensed JA2VC in Cal's neighborhood, preferring 10 'phone . . . . CE4AD has undertaken quite a project in going after his WACC; W6s in rare California counties take note . . . . W6ZOL heard from W6WD that VS6BK is QRT for reassignment, possibly VQ4 . . . . Instead of a return QSL from HA5PB, WØDEA found in the mailbox an SWL veri for reception of Radio Budapest. That seems to happen quite often in QSL dealings with some European countries . . . . W4MR and KV4AA are among the gunners drawing beads on the Kerguelen gang. Dick hears that FB8ZZ is on Amsterdam and FB8XX on Adelie with a new station soon due to open up on Wallis Islands territory. Re the latter, FK8AB adds that the call may be FK9 or FW5. Though this isn't on the Countries List now, the chances of its addition look good. This archipelago is situated near the Date Line in the center of the Fiji-Samoa-Ellice triangle . . . . FK8AB desires to express his deep thanks to the W gang for services rendered and propriety shown, especially W3JTC and W7RT, who gave John much valuable encouragement and assistance in the line of materiel and instructions. FK8AB declares that the good will demonstrated from these quarters much more than made up for rough treatment on the air at the hands of some of our more avaricious brethren . . . . CZ1DF dropped us a rather anonymous card to offer apologies if his use of the call aboard ship caused any difficulties on 14-Mc. c.w. Well, most of us can spot the usual ship QRI as a rule; yet, there may have been a few false hopes raised. He's not a Yank and had no skulduggery in mind, however. We hope he and others engaging in similar operation will condescend to append "/MM" to their calls to simplify the score on these stations . . . . SWL John DeMeyer of Lansing has an assurance from AC4NC that all stations who send him cards *will* sooner or later receive QSLs in return. Chak is having the usual tough time experienced by much rare DX in scraping up printed stock . . . . Down under, VK3ZP, with an 813 and accessorial gear all set to go, is a-twiddlin' his thumbs — no a.c. having as yet been run out to his QTH. ZL2AFZ drew a contrast to our winter snows in writing of excessive heat with frequent brush fires in the Napier vicinity. Recovering not long ago from a sprained back, George is again slapping the 14-Mc. bug in the usual fine style . . . . VK3AMR is all set to go as VK9MR in Madang, New Guinea, with a 40-watt 807 and a BC-342N. Max intends to give the W/VE population a good break and expects in return a little consideration during his schedules with VK3 — none of that "VK9MR DE so-and-so HR QRX PSE" baloney on the frequency . . . . W1RWS, who nabbed his No. 100 a short while ago, sees that 'Phone Honor Rollee VQ3ERR received QSLs from such as CR5UP, VT1RF, 3V8AP, VQ9KRL (Seychelles), UJ8KAA, UN1AB and ZS7A, all A3 confirmations and Robbie adds the opinion that the 20-'phone FN8DC is unsavory. Also, FN8AD's call has been misused on 14-Mc. A3 although there is a legit AD active. That Seychelles entry certainly is prime — Jeeves, dig up that 1925 *QST* and we'll give that newfangled loop modulation another try, eh? . . . . Our mention of the HL1 card pile-up brought a few responses according to W1IKE. Now Dick would like a line on ex-DL2OU for similar purposes . . . . If you nailed ZC6JM on dates February 2nd through 5th you'll have to reapply for a QSL. A mail plane crashed and burned with outgoing pasteboards aboard, a fate to the expectant DXer worse than chronic TVI . . . . That itchy-footed W2AIS (ex-ZC8PM) is on the prowl once more. Guess the home-stand type of DX gets a little tame for the likes of Pat. W2ESO advises the boys to keep an ear out for W2AIS/MM on 28 Mc. while he indulges in a long voyage to Far Eastern ports . . . . Heavy work schedules set up for U. S. Naval personnel keep our CN8 representatives too busy to do much about the formation of a proposed ham club in French Morocco, remarks

One of the first postwar and still one of the most consistently heard of our Trieste brethren, I1NU/Trieste continues to keep himself popular on most DX bands. (*Photo courtesy WØPVS*)

CN8EB. Quoting further, "We all operate from the same Quonset hut with the exception of one or two of us. The receiving set-up is an SX-28 with a DB-20. On the transmitting end we have several rigs left by former amateurs and several of the homebuilt variety. The antenna is a V beam, 10 wavelengths per leg on 14 Mc., centered on Washington, D. C., same being initiated by CN8EQ." Harry's account of per-band activity there has CN8s EB, ED, EE and EW sticking pretty close to 10 meters while CN8s EL and ET sometimes give 20 and 40 a whirl. CN8s EA, EM and EQ, or at least the previous holders of these calls, have since journeyed elsewhere. Incidentally, all CN8*E* stations answer to the mail QTH of Navy 214, Box H, % FPO,

(*Continued on page 120*)

A High-Frequency Crystal Filter

Selectivity for a Converter/BC-455 Receiver

BY KENNETH P. LANGE,* WØBEN

• Looking for an inexpensive receiving system for 6, 10, 20 or 40 meters? If you are, here is a way to approach big-receiver performance with a converter and an inexpensive surplus receiver. The trick is in putting a crystal filter between the converter and the BC-455.

A CONVERTER ahead of a BC-455 receiver makes a good inexpensive receiving system for 10 and 20 meters, and many of these combinations are in use throughout the country. If the converter is a good one, the system leaves nothing to be desired in the way of sensitivity, and images are no problem, but the selectivity is not adequate when the bands get crowded, as they usually are. After a lot of thought about adding a Q5-er or a crystal filter to the BC-455 and finally deciding against it, we came up with a simple answer that we would like to pass along.

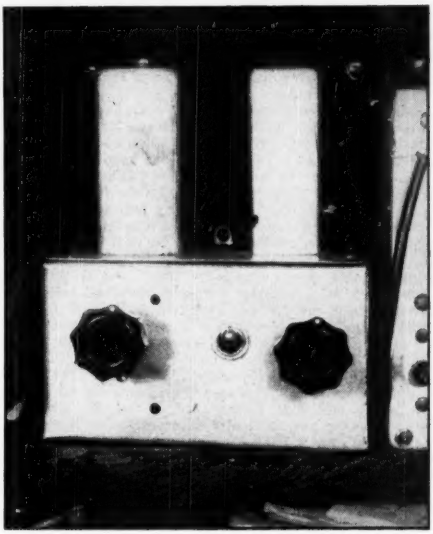
The reasoning went something like this. If adding a Q5-er or crystal filter means a lot of work (and it does!), and you can't get enough selectivity with anything you can do to the converter, how about adding something between the converter and the BC-455? I knew of no articles or information on high-frequency crystal filters, but the idea seemed promising. The dope in the *Handbook* on crystal filters was studied, the soldering iron was heated up, and an outboard crystal filter was built. The results surpassed all expectations, and the little converter/crystal filter/BC-455 receiver now gives a good account of itself in any 'phone or c.w. QRM we run into. Where before the best we could hope for was to work the loudest ones, we can now comb out the weak ones alongside the loud signals without any trouble at all. QRM can be "phased out" just as with a low-frequency crystal filter. No special crystal is necessary — several different ones have been used — and the whole unit costs much less than a five spot.

Construction

The circuit in use is the usual one converted for the higher frequency, and is shown in Fig. 1. As in a low-frequency filter, C_4 controls the "selectivity" and C_2 the "phasing" or frequency of the rejection notch.

The photographs show the construction of the filter. This particular unit is built in a 3 × 4 × 5-inch metal box recruited from the junk box along with the other parts. The input and output portions of the filter are separated by a metal partition in the box. This shield can be seen in one of the photographs, and it is indicated by the dotted line in Fig. 1. Its purpose, of course, is to minimize any "straight-through" coupling between input and output, since it is imperative that the only coupling be through the crystal.

Defunct broadcast i.f. transformer cans were used to house the two sets of coils. The coils were wound on the original forms and the original condensers were used for padders. If old transformers aren't available, the coils can be wound on ⅜-inch diameter polystyrene rod and tuned with mica compression condensers. The phasing condenser, C_2, must be insulated from the chassis, preferably without too much capacity to the chassis. The circuit L_2C_1 and the circuit $L_3C_4C_5$ should be capable of resonating either side of the crystal frequency. The crystal frequency is not too important, except that it must be the same



An outboard high-frequency crystal filter for adding selectivity to a converter/receiver combination. The controls are phasing control, crystal switch, and selectivity control.

* 416½ Omaha Street, Sioux City, Iowa.

as the output frequency of the converter and within the tuning range of the BC-455 (or whatever follows the converter). The unit was first tried with a home-ground 6.8-Mc. crystal, but a harmonic of the BC-455 oscillator fell in the 10-meter band, and an 8-Mc. FT-243 crystal was tried and found to work as well, after the circuits

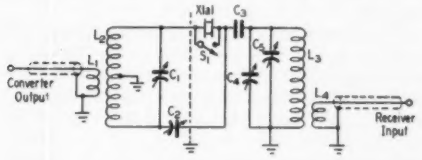


Fig. 1 — Wiring diagram of the high-frequency crystal filter.

C_1 — 200-$\mu\mu$fd. mica trimmer (see text).
C_2 — 10-$\mu\mu$fd. variable condenser.
C_3 — 30-$\mu\mu$fd. mica condenser.
C_4 — 75-$\mu\mu$fd. variable condenser.
C_5 — 150-$\mu\mu$fd. mica trimmer (see text).
L_1 — 10 turns No. 20 push-back wire wound over center of L_2.
L_2 — 42 turns No. 22 enam., close-wound on ⅜-inch diameter form. Center-tapped.
L_3 — 35 turns No. 22 enam., close-wound on ⅜-inch diameter form.
L_4 — 10 turns No. 20 push-back wire wound over ground end of L_3.
S_1 — S.p.s.t. toggle.
Xtal — Transmitter-type crystal. Converter output frequency.

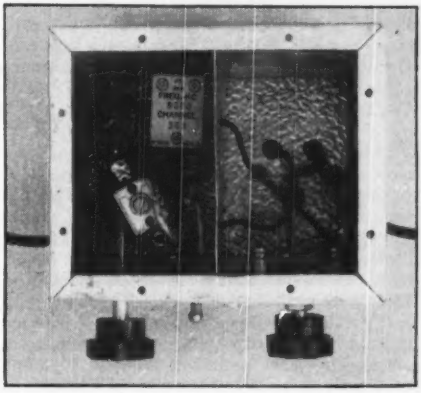
had been retuned. Naturally if you want to retain the calibration of your converter, a crystal should be used that is as close as possible to the original output frequency of the converter. This system works only with tunable converters and not with the crystal-controlled units.

Using the Filter

The first step in getting the filter to operate is to connect the converter output to the input of the filter with a shielded lead. The output of the filter connects to the regular antenna connection of the receiver. Throw S_1 to the position that shorts out the crystal. At this point strong signals should force their way through the filter, even though the coils have not been tuned. One must make sure that the receiver is tuned to the frequency of the crystal. This can be done by observing the point at which the crystal is tuned in on the receiver. It may be checked before the unit is built, in an oscillator circuit of some kind, or the calibration of the BC-455 can be used for a first approximation.

Begin tuning the unit by adjusting C_1 and C_5, with C_4 meshed at full capacity. If you have access to the tuning trimmer or condenser on the output transformer of the converter it is well to touch up this circuit. Actually there are four tuned circuits to consider in tuning the unit, although the filter will work satisfactorily by tuning only the unit itself. The four tuned circuits are: output transformer of converter, input transformer of filter, output transformer of filter, and antenna input of receiver. All four should be tuned where maximum sensitivity and output is desired or is necessary. Some receivers have a front-panel antenna tuning control and this will make it unnecessary to bother with the receiver padders or trimmers. Needless to say, if you are not familiar with the converter and receiver circuits and trimmers it is best not to attempt tuning these units. Peak the tuned circuits for maximum noise or by observing the deflection of the tuning indicator.

With C_4 at maximum capacity, throw S_1 to the position that will put the crystal in the circuit. If the tuned circuits are near resonance the filter



A bottom view of the crystal filter, showing the shield partition. The output section is on the left-hand side and includes the crystal — the phasing condenser is on the right.

should add little selectivity to the receiver, and there should be only a slight reduction in audio output of the receiver, possibly not enough to notice. The phasing condenser, C_2, should be set at about half capacity for the present. If the filter seems to sharpen the signals considerably (as characterized by a great reduction in background noise, signals and noise having a "ring" or "ping" and voices sounding low and muffled) repeak the input and output transformer leaving the crystal in operation. Tune until the signals sound normal, otherwise the filter will be oversharp when tuned for "sharp." When the signals appear to be sufficiently broad, decrease the capacity of C_4 and immediately the set should take on the sharp characteristics noted before. It may be necessary to go over the tuning a number of times before arriving at a satisfactory setting.

Only practice with the filter can teach one the

(Continued on page 118)

SOME months ago we promised to give some figures on the relative popularity of the two methods for generating a single-sideband signal. A quick check of the tally sheet shows that users of the phasing system outnumber the filter men by almost exactly 2 to 1. One interesting point that shows up is that the first man on in the call area often sets the pattern. For example, the W2s, W6s and W8s are practically solid with phasing rigs, while the W3s, W4s and WØs concentrate on filter jobs. Thus much can be traced to the influence of **W2KUJ, W2UNJ, W3MBY, W6YX, WØTQK,** and **WØMNN.** Dunno if this proves anything, but you might be able to make something out of it. And that 2-to-1 spread isn't to be construed as a final verdict on the merits of the two systems — we're only reporting what the record shows. The single-sideband gang will be very sick indeed when it stops arguing, or at least discussing, the merits of the two systems.

Further dope on **SM5QV** is that he has been on since March, 1949. After several modifications the rig ended up with an output 807 as mentioned last month. The frequency-control system is the double-conversion method in use at **W2NJR** and mentioned in the December column. Contacts so far have been only with near-by European countries on 80 meters, with lots of time spent in instructing the fellow at the other end on how to tune in a suppressed-carrier signal.

Out in Vancouver **VE7VP** and **VE7AFO** are both on with phasing jobs. The rig at AFO uses 6SN7s in the balanced modulators and ends up with about 300 watts to a pair of 811s on 3755 kc. At VP the exciter follows the W2UNJ unit, with 6AG7s in the balanced modulators, but is band-switching for 75, 20 and 10. With 120 watts on 75 KL7LJ and JA2AZ have been worked, and on 10 with 450 watts peak the DX is VK3APK. As others have found out, lack of receiver stability on 10 makes it difficult to find stations that can hold the signal, although receivers with crystal-controlled converters do a neat job and give no trouble.

Bert Baumgardner, in Omaha, has had **WØAGS** on 14,220 kc. using a filter job ending up with an 807. The WØMNN filter is followed by two frequency conversions, and Bert points out that a BC-453 came in mighty handy in setting up the low-frequency channels of his rig. With the 10 watts output, nice contacts have been made with **W6KAG, W3MBY** and **W7LWB,** including a four-way one evening on what amounted to practically a dead band.

Out in Portland, Lee Campbell, **W7ADH,** is using a rig on 75 and 20 patterned after the W3LOE rig in the November, 1948, issue of *CQ*. It ends up with an 807 tube, with provision for using another in parallel, and drives a pair of 75Ts to 250 watts peak. Plug-in coils facilitate band changing.

The newest one at the Antipodes is **VK2AC** in Sydney. Active only on 7 Mc. so far, he has a two-stage crystal filter on 5180 kc. and after one conversion the signal ends up in an 812 running 80 watts. 2AC holds that a rig of this type is the simplest yet and easy to get going. DX so far has been just around the country, with lots of time spent in educating receiving operators.

Second station on in Wisconsin — **W9BVU** was the first — is **W9OUT** at Kaukauna. "Hub" uses four 6V6s as balanced modulators in a W2UNJ rig on 75 to drive an 813 to about 175 watts input. To quote his letter, ". . . I can't praise [s.s.b.] enough. It is so far superior to any other method we amateurs have that it is really a shame so few are taking advantage of it. . . . And, when you come right down to it, a rig for s.s.b. is actually cheaper to build than an a.m. station, for the same effective power."

Leonard Nay, **WØAMY,** is on 75 from Elgin, Nebr., with a phasing rig patterned after the one described in *QST* last August, with the addition of the crystal-oscillator stage on the same chassis. Being on a small ranch with gas-generator power limits the maximum power, but the rig ends up with a pair of 1625s.

A nice letter from **W7IKY** in Seattle tells of his latest activities on 75 with the now-revamped phasing rig. Most of the effort has been toward simplification, to demonstrate to the gang around there that s.s.b. isn't so tough. Following 6SN7 balanced modulators and a passive audio phase-shift network, IKY uses a 6AG7-815-2 × 811 r.f. amplifier. A voice-operated control relay has also been incorporated, to provide rapid break-in. Copies of the circuits in use have been hectographed and sent to interested a.m. men who have been bitten by the bug. A lot of time is spent in wandering around 75 and showing the a.m. gang what s.s.b. will do, but trips to the high end have paid off with a number of East Coast QSOs. Other DX includes KL7s, KH6s and VEs.

Almost 20 years to the day that Al Prescott, **W8DLD** of Lyndhurst, Ohio, started on 20 'phone he scrapped his a.m. gear and went whole-hog on s.s.b. The result is that Al has separate phasing rigs on both 75 and 20 with all the trimmings: carrier reinsertion, sideband switching, voice-controlled break-in, low-pass audio filters in the speech amplifier, and a wealth of experience. For receiving he uses two HROs and two YRS-1s. You can find him on 14,203 around

noon on week ends and on 3999 on Sunday nights. His early experience with linear amplifiers on a.m. 'phone has stood him in good stead with the present p.p. 806 amplifiers.

Incidentally, you might be interested in the voice-controlled break-in the gang uses so effectively on 75 and sometimes on 20. The usual pattern is to pick off some of the audio from the speech amplifier, build it up through another stage and then apply it to a 6H6 connected in a voltage-doubling circuit. Plate or screen voltage to the keyed oscillator or amplifiers is fed through a dropping resistor and a series VR tube. The plate of a triode control tube is connected to the junction of the resistor and VR tube, and the cathode of the control tube is grounded. The output of the audio rectifier is applied to the grid of this control tube. With no audio through the circuit, the triode conducts and drags down the voltage at the VR tube anode below the value that will allow the VR to conduct. When audio comes through the speech amplifier and is rectified, the negative voltage developed at the rectifier cuts off the control tube and allows the VR tube to pass current to the oscillator and other controlled circuits. A condenser across the audio-rectifier load resistor "holds in" the voltage between syllables, and its value determines how long it will hold. When adjusted properly, it is very difficult to tell by listening to the signal that voice operation is being used, but the speedy break-in and side remarks are a sure tip-off. At W8DLD the receiver is blanked during transmitter-on periods by rectifying a little r.f. from the oscillator and applying the developed negative voltage to the receiver through the a.v.c. line. At W3ASW audio blanking is used.

— *B. G.*

April, 1925

. . . The ARRL Board has named President Maxim League representative to the coming Paris IARU Congress, and has authorized the establishment of a high-powered Headquarters station.

. . . John L. Reinartz, 1XAM, authors a timely article, "The Reflection of Short Waves."

. . . Bartholomew Molinari, 6AWT, is announced as Hoover Cup winner for 1924.

. . . The radio world notes sorrowfully the passing of Oliver Heaviside, British physicist.

. . . ARRL Traffic Manager F. H. Schnell has donned uniform to accompany the U. S. fleet on its training cruise to Australia. He will conduct special short-wave communications tests during the trip. F. E. Handy, 1BDI-1XAH, will be acting traffic manager during Mr. Schnell's absence.

. . . A battery-operated 3- to 5-meter transmitter is described by W. H Hoffman of 9EK.

. . . Dr. Greenleaf W. Pickard and ARRL Assistant Secretary C. A. Service report on radio tests made during the recent total eclipse of the sun.

. . . 6AWT and 6CHL have worked JA2, Nagasaki, Japan, and 6AWT and 6BCL have QSOed HVA, Hanoi, French Indo-China, for the first verified QSOs between this country and the Far East.

. . . The Grebe Synchrophase and the Browning-Drake Regenaformer, two popular broadcast receivers of the day, are described by R. R. Batcher, John M. Clayton, and Glenn H. Browning.

. . . Coming up in May *QST* — a description of the Jenkins system for the transmission of pictures by amateur radio.

. . . F. Dawson Bliley's 8XC-8GU, Erie, Penna., J. E. Hodge's 4BY, Savannah, Ga., and Ralph B. Weiss' 9AV, Union City, Ind., are subjects of the month's station descriptions section.

. . . The "Who's Who" department presents word and portrait introductions to George H. Pinney, 1CKP, F. B. Westervelt, 8VE-8ZAH, and Elliott White, 1YB.

Strays

Members of the Santa Barbara (Calif.) Amateur Radio Club are coöperating actively with other hobby groups to establish a permanent hobby center in that city. The goal of the hobbyists is a civic building which would provide quarters, workshops, and an auditorium for use by their respective clubs. Presenting a united front as the Santa Barbara Hobby Assn., Inc., the groups have already purchased a site for the center. The officers of the association include James L. Holmes, W6REK, president, and Leon A. Bartholomew, W6LC, corresponding secretary.

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Caution to BC-610 users: A 400-volt potential to chassis exists on the grids of the 100-TH modulator tubes even though the transmitter's interlocks are operative. — *Ben S. Gantz, jr.*

ONTARIO — Annual banquet of the North Shore Radio Club of Oshawa, Ontario, Canada will be held on Saturday, April 15, 1950. Come one, come all to the big festivities in the Genosha Hotel. Admission $2.50. Write Doug Hinton, VE3AZG, for tickets and additional information.

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QST is soon to be available on microfilm. Primarily for libraries, University Microfilms will produce positive microfilm copies of each volume of *QST* at a cost comparable with that of binding the same material in a conventional library binding, assuming an edition of 30 or more. Sales are restricted to those subscribing to the paper edition, and the film copy is distributed only at the end of the volume year. Interested parties should write University Microfilms, 313 N. First St., Ann Arbor, Michigan.

Correspondence From Members-

The Publishers of *QST* assume no responsibility for statements made herein by correspondents.

WELL SPOKEN!

Apt. 303, 3324 Buchanan St., Mt. Rainier, Md.

Editor, *QST:*

I become increasingly disturbed as I read more and more letters and articles in the several amateur radio publications claiming that amateur radio is certain to perish unless (a) through experimentation we immediately develop in our ham shacks, using only screwdriver and pliers, a new electronic device or system that will surpass anything well-equipped private industry or government labs can produce, (b) we expand our regulations to include as many volumes as the New York City building code, (c) we make it necessary to have a "Ph.D. in amateur radio" to obtain a license, or, (d) we band together in tight little cliques such as DX men, traffic men, v.h.f. men, 'phone men, c.w. men or the like, and have intercourse only with those in our own little group.

Yes, I am quite disturbed. Admittedly, in these days of rapid development, we must be specialists in order to survive and succeed in our vocations. I specialize in advertising representation. Others specialize in other fields in order to bring home their share of the bacon. But why do we have to carry over this tense, nerve-wracking fear of being left behind into our hobby, which is supposed to relax us?

When I come home to relax with a hobby, I don't want to extend my business worries into worries of what I must do to keep my hobby in the public eye (a form of advertising!). I don't want my hobby turning into the same mad rat-race as is found in the business world.

I think these cries of what we must do or perish come from those who allow the competition of their daily battle for the bacon to carry over into their hobby, and I say it isn't healthy. Let's relax and enjoy our hobby for the fine thing it is and cease these tired TV-movie melodramatics about how we're going to pot. I'm having just as much fun as I did 12 years ago, when I was first licensed, and I feel neither decadent nor extinct!

— *James C. Moulton, W8ILD*

STRANGER THAN FICTION

P.O. Box 369, Grimsby, Ont.

Editor, *QST:*

I ask you to cease using titles on *QST* articles that have nothing to do with the article whatsoever. For example, while looking through the index section of the December issues for an article that I vaguely remembered, it became apparent that you positively lean over backward to disguise the radio matter hidden in some of the articles. I quote from the October, 1948, issue a title "The Eyes Have It." What have they — trachoma — or did I accidentally pick up a medical journal? Maybe I picked up the journal of the United Undertakers Association, issue of January, 1949, as I see the title "The Black Box." Titles such as this leave it all to the imagination and when the title "Deep Freeze" appeared in your April, 1949, issue I get the impression that I have had it.

However, taking a cue from "Relax Men, Use Haywire" in the May, 1947, issue, I proceed through the index further and come to the "Little Slugger" in your February, 1949, effort. This gives me new hope and sure enough a title "A Halo for Six Meters" appears and I realize that someone after all may be looking after me and the six-meter men; they need it.

"Tom Thumb" in your September, 1945, issue made me realize, after reading the article, that maybe fairy tales were the order of the day after all and that perhaps the whole thing was a "Hum Bug" as quoted in October, 1949. Oh, well. I'll take a little "Dixie Jones Owl Juice" from the February, 1946, issue and end up with your best effort to date which appeared in December, 1945, simply as "Gawp."

— *William H. Gillard, VE3AQS*

HANDIE-TALKIE

4545 Augusta Blvd., Chicago 51, Ill.

Editor, *QST:*

The article, "A 10-Meter Handie-Talkie," in your July, 1949, issue was of considerable interest. By virtue of my employment, I am able to give you some of the history regarding the origination, in 1941, of the trade-mark Handie-Talkie by Motorola.

Don Mitchell, in 1941 our chief engineer, invented a miniature radiotelephone unit complete in itself and which could be held in one's hand, or carried by means of a strap fastened to the unit. The design was an immediate answer to the armed forces' urgent need for a small radiotelephone unit which could be carried easily by combat forces.

The trade-mark Handie-Talkie was coined for the set, and so it became known throughout the world, although in Signal Corps nomenclature it was "BC-611," for a company's trade-mark could not be applied directly to its products of this character manufactured for and used by the armed services. Handie-Talkie is being trade-marked by Motorola, Inc. The trade-mark actually applies to and should be used only in connection with that company's equipment, rather than becoming a generic term to denote any and all kinds of portable, hand-carried radio equipment.

I feel that you and your readers will be enlightened by this little story because, to my best knowledge, the information has never before been published, although many articles have been written about Motorola's Handie-Talkie unit.

— *W. E. McNatt, W9NFK*

LOW POWER

111 5th St., Garden City, N. Y.

Editor, *QST:*

I was interested in a letter from W2YJF in December *QST* commenting on the plight of the low-power boys and wondering what could really be done without having a 500-watt rig and all the et cetera a well-equipped ham seems to need today. And while I can't rate as a newcomer to ham radio, I can talk about low power.

About three years ago, after a 15-year lapse in ham activities, I got back on the air with a 20-watt job modeled after the "Longfeller" published in July, 1946, *QST*. For quite a while I was rock-bound and then I made myself a VFO which cost, perhaps, $10, and went to town.

To date I have managed to grab off QSOs with exactly 40 countries and all the states, taking my punishment from the high-power boys like everybody else.

I left this rig at W1QGU when I came down to Long Island for the winter; but with the S8 Contest coming up I threw together a jigger out of junk around the shack and got on the air with an input of just about 13 watts. With this I managed to QSO every U. S. district and all Canada except VE6 and VE7. I worked only mornings and only those who looked interesting to me. In all I made 85 contacts in about 12 hours at the desk.

So it can be done; and it is my guess that there is much

(*Continued on page 120*)

Strays

The high-power contingent in amateur radio will be interested in the new 5831 super-power beam triode recently announced by RCA. "Primarily of importance in high-power c.w. applications and in international broadcasting service . . . [it] is capable of generating several hundred kilowatts of power at high efficiency and with exceptionally low driving power. In unmodulated Class-C service, the 5831 has . . . a maximum plate input of 650 kw. and a maximum plate dissipation of 150 kw."

It should fit into many amateur rigs quite nicely. At 16,000 volts on the plate — one could use his present plate supply — the plate current is a meager 39 amperes. The required driving power is 900 watts, and thus any push-pull 304TL stage will drive it easily. The filament is a 6-volt affair requiring only 2220 amperes, but at least 60 seconds should be allowed for warm-up because "the starting current must never exceed 3550 amperes, even momentarily." This care is necessary because the cold resistance of the filament is 0.0005 ohm.

With a grid-plate capacity of 150 $\mu\mu$fd., neutralization becomes a simple matter, but the 600-$\mu\mu$fd. input capacity may make it difficult to build a suitable grid tank circuit on the higher frequencies. However, the output capacity of 8 $\mu\mu$fd. puts it in the same class with other amateur tubes, and normal tank circuits might serve. If the plate dissipation is held below 135 kw., only 40 gallons per minute of cooling water is required for the plate, but above this dissipation the rate should be boosted to 60 gallons per minute. This may hamper a few in the water-shortage areas and prevent running full input except during short calls. The grid can get along with 1 gallon per minute and should offer no problem.

The 5831 is less than 39 inches in over-all length and could be hidden between walls, in an attic or even a locked closet. Surely it bears watching by our more advanced amateurs.

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Our latest "Whodunnit?" (spotted by WØAK) has as its setting the City of Brotherly Love. Quoting the United Press wire service: "The electronic era has brought a new crime problem to Philadelphia police. . . . Working unobserved, somebody clipped the lead-in wires to television sets in 11 homes, leaving the wires dangling uselessly from their aerials."

HAMFEST CALENDAR

CALIFORNIA — Saturday, April 29th, at the Belmont Inn, Fresno. Sponsored by the San Joaquin Valley Radio Club. An all-day affair featuring 2- and 75-meter hidden transmitter hunts, forum, ladies' afternoon tea, banquet and entertainment in the evening. Tickets are $3.75. Advance reservations and hotel-lodging information may be obtained from W6HXR, 1943 Michigan, Fresno, Calif.

OHIO — Saturday, April 8th, at Central Armory, East 6th St. and Lakeside Ave., Cleveland. Staged by the Cleveland Area Council of Amateur Radio Clubs in coöperation with the 145th Infantry, Ohio National Guard. Program starts at 3 P.M. and includes ARRL TVI film, exhibit of communications gear by 145th Infantry, set-up of a typical ham station of 1908, and address by ARRL Great Lakes Division Director John H. Brabb, W8SPF. Buffet supper at 6 P.M. Admission, $2.00 per person. For information contact your local radio club or R. E. Bloor, W8LYD, 12101 Brighton Ave., Cleveland 11, Ohio, Tel. Orchard 5272.

WASHINGTON — Saturday, April 15th, at the Elks Club, 5th-Pacific Streets, Bremerton. Staged by the Amateur Radio Assn. of Bremerton, Inc. Refreshments, entertainment, fried-chicken dinner are programmed. Tickets, $3.50, are available from R. V. Mallette, W7MIK, 1245 8th Street, Bremerton, Wash.

WISCONSIN — Saturday, April 15th, at the Zion School (back of the Elks Club), Wausau. Auspices Wisconsin Valley Radio Association. Starts at 6 P.M. and features an excellent banquet, good speaker, hamfesting galore. Please make reservations in advance to assist with meal plans. Tickets, $2.00, are available from Lawrence Lapinske, W9EWM, P. O. Box 179, Wausau, Wisc.

WISCONSIN — Saturday, April 29th, 7 P.M., at the Elks Club, Wisconsin Rapids — Second Annual Banquet and Hamfest sponsored by the Central Wisconsin Amateur Radio Club. A well-rounded program has been arranged, including good food, entertainment, speakers, contests. For advance reservations write CWARC, c/o Gordon L. Miller, 441 West Grand Ave., Wisconsin Rapids, Wisc.

WWV-WWVH SCHEDULES

THE technical radio broadcast services over WWV, Beltsville, Md., and WWVH, Maui, T. of H., were revised effective Jan. 1, 1950. Except in certain details, these services of the National Bureau of Standards do not differ greatly from those given in the past.

The revised services from WWV include (1) standard radio frequencies of 2.5, 5, 10, 15, 20, 25, 30 and 35 Mc., (2) time announcements at 5-minute intervals by voice and International Morse code, (3) standard time intervals of 1 second, and 1, 4 and 5 minutes, (4) standard audio frequencies of 440 cycles (the standard musical pitch A above middle C) and 600 cycles, (5) radio propagation disturbance warnings by International Morse code consisting of the letters W, U or N, indicating warning, unstable conditions, or normal, respectively.

The audio frequencies are interrupted at precisely one minute before the hour and are resumed precisely on the hour and each five minutes thereafter. Code announcements are in GCT using the 24-hour system beginning with 0000 at midnight; voice announcements are in EST. The audio frequencies are transmitted alternately: The 600-cycle tone starts precisely on the hour and every 10 minutes thereafter, continuing for 4 minutes; the 440-cycle tone starts precisely five minutes after the hour and every 10 minutes thereafter, continuing for 4 minutes. Each carrier frequency is modulated by a seconds pulse which is heard as a faint tick; the pulse at the beginning of the last second of each minute is omitted.

Station WWVH operates on an experimental basis on 5, 10 and 15 Mc. The program of broadcasts on the three frequencies is essentially the same as that of WWV. Time announcements in GCT are given from WWVH every five minutes by International Morse code only.

Hints and Kinks For the Experimenter

SOMETHING NEW IN MATCHING DEVICES

SHOWN in Fig. 1 is a new and different system of feeding the driven element in a beam antenna. It provides a simple means of getting power from a coaxial feed line into the antenna without elaborate and fussy matching devices. At W6GKM, it has been used with gratifying reduction in TVI even though an antenna coupler is not used. Checks made with a "twin-lamp" indicate a low standing-wave ratio over the entire 28-Mc. band, and equal loading over the same range is obtained.

The dimensions given here are for a 10-meter beam, but similar arrangements can be worked out for other bands. An 8-foot length of RG-8/U coaxial cable is used in modified form to excite the driven element of the antenna. At each end of the length of coax the inner conductor and the shield braid are soldered together. At the exact center the black Vinyl covering and the shield braid are opened, and are removed to leave a ⅜-inch gap, as shown in the drawing. Do not cut through the polyethylene dielectric.

Another length of RG-8/U cable is used as the feed line. The inner conductor of the feed line is connected to the braid on one side of the "dipole" described above, the braid of the feed cable going to the braid on the other side of the gap. In making these joints, be careful not to apply too much heat or the dielectric of the cable will melt and permit the inner conductor to short to the shield braid. In attaching the feed line, wrap the inner conductor completely around the dipole to gain mechanical strength. The braid-to-braid connection can be wrapped with heavy wire. Tape the entire joint and the short-circuited ends to prevent contact between the exposed braid and the driven element of the antenna.

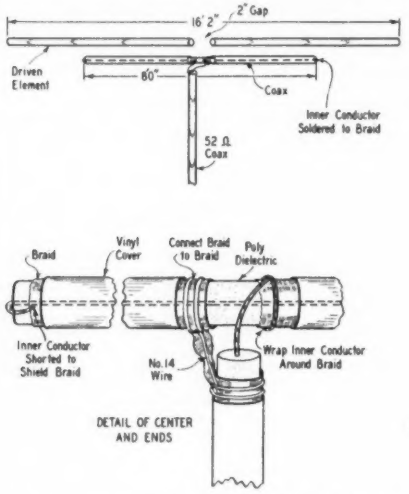

Fig. 1 — An unusual system for feeding the beam antenna. A "dipole" made from RG-8/U coaxial cable is coupled to the driven element of the antenna as shown. No matching adjustments are required.

The "dipole" is then coupled to the driven element of the antenna by being held closely parallel to it by any suitable means. It may be taped to the driven element at several points if care is taken to avoid short circuits between the "dipole" and the driven element.

Note that the driven element must be split at the center as shown in the diagram. A separation of 2 inches between the two halves will allow sufficient clearance. If the driven element is cut to 16 feet, 2 inches, it will be about right for the low-frequency end of the band. Slightly shorter lengths should be used for the high-frequency end.

A coaxial link is recommended for coupling to the line at the transmitter, with a coaxial change-over relay. Care should be taken to eliminate all "sloppy" joints, and the outer conductor of the feed line, as well as the transmitter, should be well grounded. For additional aids in TVI elimination, a low-pass filter should be installed between the transmitter and the line, and high-pass filters of the type described in *QST* for May, 1949, should be used at the TV receiver to prevent overloading by the fundamental 28-Mc. signal.

To get the best results when the antenna is used for receiving, a simple antenna coupler such as the "L"-section unit described in the 1950 *Radio Amateur's Handbook* (page 129) is suggested.

At W6GKM the beam is mounted on top of the house, and neighbors on all sides have TV antennas close by. Operating at 125 watts input in the 28-Mc. band, most of the 50 TV receivers within a 2-block radius now receive no interference from the transmitter. Some difficulty is still present in one case involving poor i.f. rejection in a receiver about a half block away, but with the feed system described here, plus suitable filters, the harmonic problem seems well in hand.

— *Dale G. Frink, W6GKM*

TORQUE PROTECTION FOR ROTARY BEAM ANTENNAS

CONSIDERABLE torque is developed when the wind blows against a beam antenna, as evidenced by the attempts the beam makes to "head up" into the wind. If you use a fairly long shaft to couple power from the drive mechanism to the antenna itself, you've probably noticed the way the antenna swings back and forth in a gale. In time, the torque thus developed can do considerable damage to the drive shaft, or to the pins used to make joints between

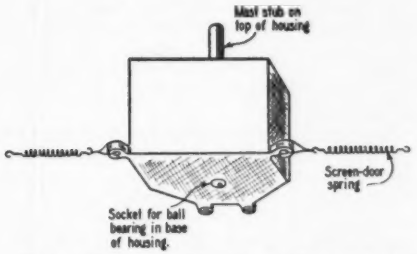

Fig. 2 — **Shock mounting the rotating mechanism of a beam antenna reduces the effects of torque produced by wind. This system, used by W1PID, provides excellent protection and assures that the beam will return to the original direction after each gust.**

sections of the shaft. This was the case at W1PID, where telescoping sections of pipe locked together with self-tapping screws are used between the drive mechanism and the antenna. Investigation revealed that the shanks of the screws were slowly but surely chewing into the slots of the pipe, making a sloppy joint instead of the original snug fit.

A simple shock mount for the rotator box, as shown in Fig. 2, solved the entire problem. Now, when the wind blows, the beam swings, but the entire assembly of antenna, drive shaft, and rotating mechanism swings with it, and the torque is dissipated in a pair of screen-door springs, which also serve to return the antenna to its original heading.

The shock mounting is accomplished as follows: The rotator box is raised an inch or more off its platform, and a ball bearing is rolled into a socket in the base directly under the rotator bearing. If your platform is wood, it would be advisable to slip a piece of flat metal under the bearing to reduce friction. The entire rotator box will now swing readily. Attach the springs to the front corners of the rotator box, where they will have some slight mechanical advantage in pulling the assembly back to its original position. The springs should be stretched horizontally and away from each other in a straight line, with the far ends fastened to something solid.

Other spring-mounted arrangements can no doubt be worked out to fit individual needs. The size, type, and position of the springs will determine how much "cushioning" is obtained. A "soft" cushion will permit a greater arc of swing, and proportionate reduction of the damaging effects of torque. A hard cushion will hold the beam steadier, but with proportionate increase in the shock factor. Here is one precaution: There should be a bearing installed near the bottom of the lowest section of pipe so that when the springs are performing their function they will not pull the rotator box out of line and bend the pipe. Every support using multiple pipe sections should have at least two well-spaced bearings anyway. — *Gorham Cluett, W1PID*

"CLAMPER" TUBE TROUBLES

SEVERAL instances of improper transmitter operation have been reported by stations using the convenient "clamper" tube arrangement shown in Fig. 3 to eliminate the need for fixed bias in a tetrode amplifier. The operation of this circuit has been described previously on page 16 of *QST* for October, 1946, and in recent editions of *The Radio Amateur's Handbook*.

In most cases, difficulty is encountered only when the transmitter is operated in the 28-Mc. band. The symptoms vary, but in general all may be traced directly to the presence of r.f. at the

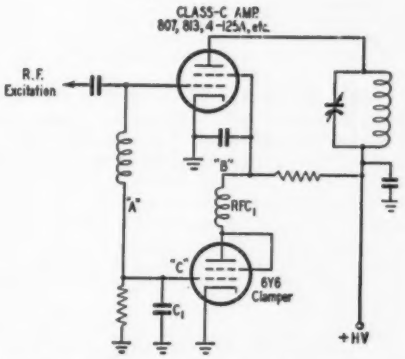

Fig. 3 — **Method of insuring proper operation of a "clamper" tube. A good r.f. by-pass is added at the grid of the 6Y6, and a parasitic choke is inserted in its plate lead. Leads designated "A," "B," and "C" should be kept as short as possible. The by-pass condenser C_1 should be about 470 $\mu\mu$fd., and the r.f. choke RFC_1 suitable for the frequency of whatever parasitic is encountered in the 6Y6 stage.**

grid of the 6Y6 clamper tube. A good mica by-pass installed right at the grid of the tube as shown in Fig. 3 usually solves the trouble.

Less common troubles include parasitic oscillation in the 6Y6 circuit itself. The frequency is apt to be anywhere in the v.h.f. range, but in at

(Continued on page 116)

Operating News

F. E. HANDY, W1BDI, Communications Mgr.
JOHN E. CANN, W1RWS, Asst. Comm. Mgr., C.W.
GEORGE HART, W1NJM, Natl. Emerg. Coördinator

♦

J. A. MOSKEY, W1JMY, Deputy Comm. Mgr.
L. G. McCOY, W1ICP, Asst. Comm. Mgr., 'Phone
LILLIAN M. SALTER, Administrative Aide

Should You QSL? W3OOP has a most unusual double-card QSL in which he asks this question. One half of the card is devoted to a "questionnaire" that leaves the answer up to you — and if you qualify as guilty on *too many* self-checked counts which cover many sectors of amateur operating habits your response can be omitted. (If you don't QSL in a reasonable time he puts it down to your failure to qualify!)

How would you do on some of his points to be checked, a check mark meaning "yes"?

Marriage Expert	
XYL Management Expert, Grade 1, 2 or 3?	
Out-of-Band Work Expert	
Edge-of-Band Expert	
Ignoring Beginners	
Half-Hour Tuner	
VFO Slider, intent larceny	
Background Shrieker	
Non-Signer on CQ calls	
Ten-Minute Whistler	
Panning ARRL	panning FCC
Panning c.w. oprs	panning 'phone oprs
Panning n.f.m. oprs	panning beginners

"160" Successes. "This band is becoming more and more active. Numerous 'phone and c.w. sigs are there into the wee small hours. Even DX, not thought of by many in connection with the Top Band, is there! Active Gs are between 1770 and 1800 kc. usually." So writes W1BB in reporting several Gs QSOed there, one with only 10 watts input! He says that loran (only S1–2 at his shack) is cut out with the noise limiter in just part way which doesn't hurt the signal to speak of. This season's *first* 160-meter transocean work on Dec. 18th was reported by W4NNN who worked G3PU on c.w., and later G2PL, G6BQ and G3FAB. First 160 'phone across in the New Year seems to have been W1BB with G2PL Jan. 22nd, 2:30 A.M. EST. "How's DX?" will give you the calls of many more Gs, GDs and GMs worked; also there's FA8, KV4AA and a PY reported active on this band.

Invitation to Official Observing! Wouldn't you like to belong to that select group who assist other amateurs to avoid FCC notices and trouble? The ARRL Board of Directors, at the 1949 annual meeting, on behalf of the whole fraternity commended observers for the fine job done. FCC officials have praised the system and informally recommended its extension.

If you have good stable receiving equipment, and are an experienced member with know-how in distinguishing between images and the signals themselves, and alert to double-check against the possibility of mistakes introduced by propagation conditions or receiver overload — and are an honest chap with some judgment and tact and live in ARRL field-organization territory (see page 6, *QST*) the job is practically yours! Present ARRL policy is to expand somewhat the OO system in the categories of 'phone- (III) and of c.w.-signal (IV) observing. Drop a radiogram or postcard to ARRL Hq. asking for the appropriate OO application forms. Fill these out and ship 'em off to your section manager.

All ARRL members are urged and invited to make themselves available for friendly observing work, to help in keeping brother hams out of FCC difficulties, also assisting to make and keep

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The Rock Creek Amateur Radio Association of Bethesda, Md., sponsored an amateur radio exhibit and provided free message service at the Bethesda Trade Show in December. Here is a view of the installation, showing W3PRT and W3IZE taking one of the operating shifts. The station handled close to 200 messages and was well received by the public, many of whom had never heard of amateur radio. Eighty-meter c.w. was used for the bulk of the messages, with a 2-meter supplementary channel for local traffic.

our bands clean and pleasurable for amateur operating.

Did you think a frequency standard was necessary for every observer? No, that's only necessary for *those classes* of OO who specialize in frequency-measurement work. We can use some of those, too, but have more nearly a full quota at the present time. Data on that which requires meeting the system standards in a practical on-the-air test will be sent on request. . . . The best way to get notices of the four annual tests (FMTs) is to get in on the 'phone- and c.w.-signal observing which brings the announcements for those who care to try. But by far the more important section of practical observing work at the present time is that concerned with sending around the good word: concerning poor notes, clicks, parasites, overstrong harmonics, splatter and modulation difficulties that can be observed and studied, etc. The idea is to keep all our ham stations and bands at top performance — and to pass a friendly tip to amateurs whose signals aren't quite the tops so they can look into the set-up as they feel like or not. In quite a few cases this has helped avoid FCC trouble; in others notices arrived simultaneously. In any event, can you give us a hand at this observing, OM?

April CD Parties: C.W. Apr. 15th–16th, 'Phone Apr. 22nd–23rd. Something new is being tried; responsive to an opinion check conducted by the CD (four-to-one in favor) the quarterly radio get-together will have *separate 'phone and c.w. periods.* All SCM station and leadership appointees, also officials by election or appointment, are eligible. CD Party results in the last one are reported elsewhere in these columns. These get-togethers are tops in amateur operating and fraternalism. . . . BCNU in the Party, both sections.

Speaking of appointments: All ARRL members not holding some station or other appointment for which qualified (along the lines of natural interest) are cordially invited to become an SCM appointee. If interested in traffic, 'phone work, v.h.f. experimenting or other specialties, there's a place for you — by appointment of your SCM. Our booklet *Operating an Amateur Radio Station* has data on all the posts and also contains an application form to be sent the SCM when filled out. Why not (today) start a radiogram to ARRL Headquarters asking for information and application blank for the particular appointment you would like to hold? — *F.E.H.*

BRIEF

Add "Father and Son" schedules: Willis Brown, W3HB, Bethesda, Md., keeps schedules with son Don, W1JSM, Waltham, Mass. Juan Castanera, KP4CC, Santurce, Puerto Rico, works son Juan, W3PEC, Washington, D. C., regularly.

JANUARY CD QSO PARTY

Listed below are the highest claimed scores for the January 28th–29th CD QSO Party. Complete results, with listings by divisions and sections, will appear in the April CD Bulletin.

Station	*Score*	*Contacts*	*Different Stations*	*Sections*
W3EOP	1,077,300	506	355	65
W4KFC	990,360	517	316	62
W6BES	794,880	320	218	58
W1EOB	775,720	444	286	58
W9BRD	753,740	439	276	62
W4IA	620,160	377	264	59
W9JNC	563,010	358	240	54
W1JYH	486,750	350	227	48
W9CBE	477,375	328	228	57
W3LIW	465,760	328	235	49
W9BQJ	461,290	321	225	58
W3POW	454,360	301	242	54
W8TZO	445,230	299	238	53
W1PCH	434,070	318	223	50
W5IUW	432,135	285	243	54
W2GFG	395,010	290	211	55
W2ZVW	381,980	277	216	53
W3AIZ	381,900	281	215	53
W1QMJ	381,060	285	207	54
W1KRV	380,610	287	213	53
W6BIP	374,306	202	145	57
W7KGJ	367,815	185	160	57
W2CWK	364,320	270	212	52
W9YTV	347,760	269	198	54
W7QAP	340,092	201	140	48
W1CRW	326,340	259	202	50
W2RPH	307,275	250	189	52
W3NTD	307,115	232	192	47
W2OBU	297,435	245	191	46
W4FF	289,800	224	201	51
W7KWC	276,210	165	138	48
W8DAE	267,810	230	177	49
W1JTD	255,060	227	169	49
W1NXX	252,880	225	173	45
W1CJH	252,720	243	163	45
W2NIY	252,040	242	178	43

Others with scores over 150,000: W1LVQ 248,520, W9FXA 244,080, W1QIS 241,955, W9QLW 239,760, W6CMN 230,408, W9UBP 224,700, W7JC 222,820, VE2GM 218,790, W6VAQ 216,972, W4IQV 214,065, W1AQE 210,090, W6CUF 207,397, W9GDI 204,015, W8YAH 198,900, W3JHW 194,025, W2MHE 192,910, W1VB 186,225, W8ZJM 186,225, W4AYV 183,360, W4KYD 181,390, W2WIK 180,600, W1FTX 172,855, W9TT 171,390, W1BIH 170,170, VE3BVR 166,860, W2YGW 166,650, W3NRE 166,400, W9VOQ 160,160, VE3BUR 158,340, W3CUL 153,790, WØTKX 151,060.

A.R.R.L. ACTIVITIES CALENDAR

April 1st: CP Qualifying Run — W6OWP
April 19th: CP Qualifying Run — W1AW, WØTQD
April 15th–16th: CD QSO Party (c.w.)
April 22nd–23rd: CD QSO Party ('phone)
May 5th: CP Qualifying Run — W6OWP
May 16th: CP Qualifying Run — W1AW, WØTQD
June 3rd: V.H.F. Contest
June 4th: CP Qualifying Run — W6OWP
June 15th: CP Qualifying Run — W1AW, WØTQD
June 24th–25th: ARRL Field Day
July 7th: CP Qualifying Run — W6OWP
July 17th: CP Qualifying Run — W1AW, WØTQD
July 22nd–23rd: CD QSO Party
Aug. 4th: CP Qualifying Run — W6OWP
Aug. 18th: CP Qualifying Run — W1AW, WØTQD
Sept. 9th: CP Qualifying Run — W6OWP
Sept. 20th: CP Qualifying Run — W1AW, WØTQD
Sept. 23rd–24th: V.H.F. Contest

A.E.C. TIP-OF-THE-MONTH

Amateur mobile units going out on emergency assignments are prone to consider only the equipment in the car and how it works. There are two other items just as essential for proper mobile operation: the *car* and the *operator*. If you do not provide for proper operation of all three of them, you may as well forget about the whole thing and go home. The Albany County (N. Y.) AEC has devised a check list for all mobiles before going out on any emergency assignment which might be of long duration, providing all accessories for the *car*, the *rig* and the *man*. Not satisfied with that, they have actually gotten together a few "kits" of these accessories and stored them in the EC's garage, readily available at any time.
—*W2SUL*

Members of the Oregon Emergency Net, along with other amateurs in the vicinity, took part in the search for Ruth Aberle, a young girl who became lost in the hills near Kelso, Washington, on December 11th. The terrain was so rugged and so thickly covered with brush that only small handie-talkies were useful in the field, and in many cases the antennas of these had to be retracted when moving around. At the start of the search there was several inches of snow on the ground, but this changed to slush and mud as the rain came pelting down. W7KZI was called by the sheriff's office at 0300 December 12th and asked to establish radio contact with the searching parties, but W7HGF took the first shift because of KZI's working hours. Both HGF and KZI have their panel trucks equipped with emergency gear. W7HGF moved into search headquarters early Monday morning and set up some gear in a tent and started assisting in organizing the search parties, using six handie-talkies operating on 3885 kc. for field work. Naturally, QRM was rugged. W7KZI relieved W7HGF at search headquarters the following night. The Oregon Emergency Net was alerted and the Washington SEC, W7KAA, was contacted. From then until Thursday, December 15th, when the girl was found alive and well, Oregon and Washington amateurs, as well as many others near and far, took part in the search, either by maintaining contact with the search parties or by using their good offices to keep 3885 cleared so that the weak signals from the handie-talkies could be heard. W7GXO and W7KZI were making a tape recording from the field for one of the local broadcast stations when the news broke that the girl had been found, and were able to get the details on the tape, a copy of which was sent to ARRL Headquarters. W7HDN, Oregon PAM, who sent us this information, lists the following as having participated, although he admits it is not complete: W5JIC; W7s AAT, DIS, FU, GM, GXO, GYA, HDN, HGF, HJU, JFB, JGE, JIP, KAA, KZI, LPT, NDS, QGN, RT; W9RE. As always, a word of thanks is in order for those who also served by standing by.

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Given all the parts and the necessary tools, how long would it take you to put together an emergency transmitter? The San Fernando Valley Amateur Radio Club (Calif.) decided to find out and divided its membership into several teams competing against each other. The winning team of four amateurs completed a working emergency transmitter in fourteen minutes and eleven seconds. A worth-while activity, and a lot of fun. Maybe someone can better that record?

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North Texas history repeated itself January 31st, by a severe icing condition and disrupted communications. Bonham and Denton were the largest among many North Texas cities hit hard. Fortunately, plans had previously been made to effect liaison with the Naval Reserve Training Unit for utilization of Navy equipment and personnel in the ARRL Emergency Corps program. Although the emergency developed before the plan had had a chance to be tested, this plan was given the "real" test we spoke about in February *QST* — a real emergency; and it proved to be a good plan. Naval units NDF-33, NBE-9 and N8AAJ, operated by Navy personnel and local amateurs, among whom were W5BKH, W5KUC, W5DM, W5OTH, W5ORV and W5OQZ, worked hand-in-hand with the North Texas Section AEC organization to effect prompt and effective relief to affected areas.

In Bonham, W5GZU carried the ball with emergency power until it was necessary to make his generator available for hospital use, after which W5OYT and W5JQH took over. W5CC in Denton moved plenty of traffic in a hurry, using emergency power at full input. Other amateurs who came on the air with emergency power to conduct communication for isolated areas were W5KVV in Paris, W5LGY in Commerce, W5GML in Honey Grove, and W5JKY in Garland. Dallas, although ice-laden, suffered only minor interruptions of power and wire service, but several Dallas stations were active to handle emergency traffic with isolated communities, among them W5CDU, W5CJJ, W5FDI, W5KUY and W5MQH. During the course of the emergency, mobiles were dispatched by the Naval Reserve unit in Dallas to establish communication with isolated communities where required, working cross-band with amateurs as necessary.

All North Texas nets were alerted, and it is believed that the entire membership of the extensive North Texas Emergency Net system was on hand, in addition to members of the South Texas Emergency Nets and the Oklahoma Emergency Net. W5CDU and W5AAO, North Texas SCM and SEC respectively, despair of giving full credit to everyone who participated; the following list of calls, in addition to those mentioned above, are those who were remembered as being active: W5s ARK, AW, AWT, BBH, BFA, BFI, BJ, BLU, BYV, DSH, FNY, FOY, GLW, GYW, IRZ, IT, IWQ, JDZ, KPB, LEZ, MAW, MK, MVL, OFN, OIP PCO; WØTGL. Nice going, all!

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In mid-January, the Ohio River threatened to go on a rampage again, and emergency facilities were alerted all

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Dignitaries of the ARRL, the Northern New Jersey Radio Association and the Northern Valley Red Cross Chapter of Englewood, N. J., got together on January 16th to dedicate station W2DAY, sponsored by and licensed to the club, in the Red Cross Chapter House. *Left to right:* W2NJF (alternate director, ARRL), W2CCS (NNJRA Pres.), W2SOX (Dir., Hudson Division), W2DCL, W2UWK (Bergen Co. EC), W2JUC, W2NUL (Passaic Co. EC), W2ZBY, W2DIB/2, W2NCY (Chief Opr.) . . . .

along the river by Ohio River Regional Coördinator W8UPB. Upon receiving advices that an emergency was imminent at Owensboro, Ky., SECs W4BEW and W8UPB were immediately contacted, along with several ECs along the river. The situation was soon reported "well under control" and everybody was standing by ready to go into action at a moment's notice. W4BEW sent mobile equipment to Calhoun, Ky., to take care of a pending emergency in that area. W4JXB, W4NIX and W4OYI took part in this operation, using battery-powered transmitter-receiver units supplied by the Naval Reserve, and upon arrival established contact with K4NRR at the Naval Reserve Armory in Owensboro, operating on 3885 kc., the frequency of the handie-talkies furnished by the National Guard. W4LTQ and W4NZO later also went to Calhoun to assist, while W4LUB, W4PDW and W4PFQ kept K4NRR on the air. Early Sunday morning, January 15th, W4NIX and W4PDW went to Calhoun with a portable transmitter and contacted W4JXB in Owensboro.

While the emergency did not become serious, the whole operation was a magnificent demonstration of teamwork between AEC, National Guard, USNR and MARS units, and served as an excellent test of equipment, facilities and plans; thus assurance has been given that emergency communication along the Ohio River, given to frequent floods, will not be wanting if and when it is needed.

NATIONAL CALLING AND EMERGENCY FREQUENCIES

C.W.	*'PHONE*
7100 kc. (day)	3875 kc.
3550 kc. (night)	14,225 kc.
14,050 kc.	

During periods of communications emergency these channels will be monitored by stations of the National Emergency Net for personal-inquiry traffic. At other times, these frequencies can be used as general calling frequencies to expedite general traffic movement between amateur stations. Emergency traffic has precedence. After contact has been made the frequency should be *vacated immediately* to accommodate other callers.

NORTHWEST EMERGENCY

During the period of January 10th to January 22nd, Northern California and the Pacific Northwest suffered a continuous series of winds, heavy snows and ice storms, resulting in widespread disruption of communications facilities to the extent that the Red Cross eventually declared an emergency throughout the whole area. During this period amateur emergency work was so intense that full coverage of details is impossible. We present herewith some of the high spots, as sent in by W7HDN.

Mother Nature opened hostilities with severe wind and lightning storms in the Coos Bay (Ore.) area. W7EJF, Coos Bay EC, went into operation for 11 hours handling traffic into and out of the Oregon Emergency Net. The net was then alerted on a 24-hour basis when W6BML notified that Northern California was having blizzards and communication and power outages. Ice storms occurred in the Coos Bay area on January 12th and 13th, cutting off all highways, railroads and communications. W7EJF went into action again, handling emergency traffic for the Red Cross, West Coast Airlines and CAA. Newport was served by W7GEJ and W7SK. At Tillamook W7BUH handled Associated Press traffic with W7AIZ in Portland. W7FKA served the Southern Pacific Railroad with the assistance of W7HNR. W7GVX, W7NND and W7PE handled traffic for the sheriff's posse and the Oregon Coast Highway Association.

On January 19th a more severe recurrence of communication and power outages hit the area including Tillamook, Astoria and the Washington coast. Mains from the Bonneville dam failed, leaving many communities along the lower Columbia River without power. W7KZI, using battery power much of the time, did yeoman service at Longview, assisted by W7FON and W7LPT. In Ranier W7APD and W7LHL carried the ball, and in Astoria W7s GOO, BOO, HJU, OAK and EBQ handled communications which would otherwise have gone over eighteen miles of four-crossarm poles which were out between Astoria and Portland. In Portland, W7HVX moved his BC-654 into Red Cross headquarters, assisted by W7s MXT, IIV, OBN and IES, but QRM was too heavy, so W7DZL installed a higher-powered transmitter. Other amateurs active in Portland were W7s IIJ, GXO, FY, HDN, AIZ, ACZ, WJ, AXJ, ESJ, EX and ADH. W6s BPT, CXO, TT and W7GTN assisted in keeping the Oregon Emergency Net frequency of 3865 clear for emergency traffic. Because of heavy QRM and skip distance it was necessary to use relay stations in many cases. Assisting in this capacity were W6s CXO, JDN, KUP, YNM, YUH, W7s EGR, FFR, HCJ, JJN, LWX and QGN, VE6GK, and VE7s TM, US and UT. At Medford, W7HLF and W7GEU/7 handled airline traffic from Coos Bay, and at Ashland W7BQK handled traffic for the Red Cross assisted by W7s FMX, FPK, FRT, KHV and LWW. W7s LVN, HWC and KL operated mobile with W7HPS doing relay work for them. W7APF did the brunt of the NCS work, although many other stations shared it. Corvallis was handled by W7s MHT and MUK, while W7MNS relayed for them. W7GZW conducted liaison with the 28-Mc. nets including W7s CNA, AKC, FJD, AUH and HA. Richland was represented by W7s QGN and BX, Pasco by W7BIW, Bend by W7s GNJ, HHH and SY, and Klamath Falls by W7s JRU and VW.

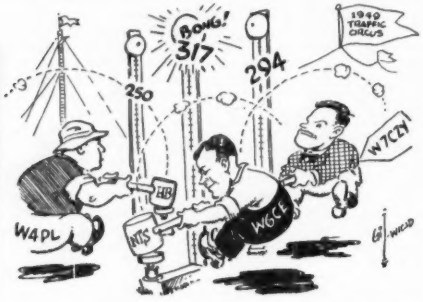
Also active during the emergency but not mentioned above were W7s AJN, AKC, BDN, BSY, DIS, EHW, EPI, FNJ, HCN, HDY, HHQ, HOE, HSY, JKU, JVO, KTL, LHT, LK, LXW, MLJ, MQ, NGG and WL. All in all, sounds like we have mentioned above every active amateur in the Northwest. On the contrary, W7HDN assures us that the above were only the more active stations who were needed and utilized; he is sure some have been omitted and apologizes beforehand. Both 'phone and c.w. were used extensively. All nets, both emergency and traffic, played important parts, and operation was conducted on the 80-, 75-, 40-, 10- and 2-meter bands. No less than 17 agencies and commercial organizations were served by amateur radio, and probably many more than that indirectly, to say nothing of the many messages handled on behalf of the general public directly. Newspapers in the area responded favorably to the amateurs' work. As a result, another star appears on the record of the amateur service.

. . . . And here's the station. The cabinet was built by NNJRA and inserted in an unused fireplace opening. The lower half drops down for storage and power supplies. Removing the legs, the cover can be closed and locked, showing the framed station license mounted on the outside. W2NCY modified and standardized the many ARC-5 units available for instant interchange. The operator shown at the key is W2DCL. Many spare units are not shown.

TRAFFIC TOPICS

W6CE, W7CZY and W4PL staged a stirring battle for "traffic champ" honors in 1949, with W6CE finally winning out on the basis of a terrific late-season performance, while Ben, W4PL, was forced for reasons of ill health to curtail his traffic activities toward the end of the year. All three of the top performers and one other (W6DDE) made 100 per cent BPL in 1949. Tim, W6CE, amassed 317 BPL points toward his postwar record, and a traffic total for the year of 27,385! This averages out at 2282 per month. His high was in December when he racked up 5056 points, with a low the previous January when he made a measly 939. Tim headed the BPL six times in 1949.

W4PL took a commanding lead in the early part of the year, but Tim kept improving each month, passing W7CZY



in August and W4PL in September. W7CZY then passed W4PL in November. Larry, W7CZY, paced Tim the rest of the year, accumulating 294 BPL points and a traffic total of 25,165, also better than a 2000-per-month average.

W4PL, the dean of all traffic-handlers, knocked off 240 additional BPL points to add to his postwar total, thus keeping him far out in front in this department. Ben's 1949 traffic total was 20,633 which "ain't hay."

Runners-up for 1949 (BPL points in parentheses) were W7CKT (160), W5GZU (148), W2TYU (129), W9EBX (128), W6FDR (111), W8NOH (94) and W6DDE (94).

Looking at the traffic-handling picture by call areas, it is again apparent that the West Coast was way out in front from the standpoint of volume of traffic handled. This year the W7s lead the way, beating out the W6s by a pretty good margin, quite the reverse of last year. No discredit to W6-land, which considerably improved its 1948 record, but lots of credit to W7-land, which more than tripled its 1948 performance. All U.S. call areas bettered their last year's records, the W4s more than quadrupling their 8 BPL listings of last year. It is also noteworthy that only one of the high stations is a "repeater" (W4PL, naturally).

Call Area	*No. BPLs*	*High Station*	*Runners-Up*	*BPL Traffic*
W7	80	W7CZY	W7CKT, W7ZU	65,691
W6	67	W6CE	W6FDR, W6DDE	55,955
W2	45	W2TYU	W2RUF, W2BYF	22,300
WØ	41	WØZJO	WØHMM, WØQXO	21,714
W4	39	W4PL	W4IQV, W4PYV	36,559
W5	39	W5GZU	W5LSN, W5DRW	24,814
W1	39	W1QMJ	W1CRW, W1NJM	12,050
W8	37	W8NOH	W8RJC, W8UUS	13,918
W9	35	W9EBX	W9QIL, W9ESJ	20,453
W3	17	W3CUL	W3ECP, W3NRE	10,164
VE	4	VE1BK	VE3IA, VE3WK	1,107

Since the end of the war, W4PL has consistently handled more traffic than any other trafficker and maintains a stout lead in total postwar BPL points (425). W7CZY falls into second place with 341 and another Washingtonian, W7CKT, who took top honors last year, rates third with 335. W6CE is fourth, only two points behind. The rest of the top ten include W6REB (243), W2TYU (226), W6FDR (209), W5GZU (193), WØHMM (191), W9EBX (128).

Review of 1949 among the traffic gang would not be complete without mention of a few organizers who devote their time to directing and managing nets in addition to handling traffic. The National Traffic System has a leveling influence in that available traffic is spread among more traffickers — as many traffickers as are available and willing to handle it. Few, if any, of the above-listed amateurs were consciously and deliberately seeking honors for their 1949 performances; they simply handled the traffic that came to them to the best of their ability and in the time they had available. If they had help, they utilized it and "spread out" traffic-handling opportunities, which is as it should be and is one of the principles to which NTS is dedicated. We doff our hats to the following, who while not running up any stupendous traffic totals, are primarily responsible for the progress the National Traffic System made in its first three months of operation! W2CLL, whose Eastern Area Net has become a model of operating efficiency on the East Coast; WØHMM, whose battle against difficult circumstances in the Central Area has made it impossible for him to maintain his last year's traffic pace; WØIC, who was well on his way to complete organization in the Mountain Area when personal circumstances made it necessary for him to place the job in the capable hands of WØZJO; and W7FIX, whose *Pacific Area Net News* is not a little responsible for the continued maintenance of a high traffic interest on the West Coast. Your efforts were not overlooked, fellows. Nor were those of regional managers W1BVR, W2PRE, W3GEG, W4ANK, W4NNJ, W6CE, W7CZY, W8NOH, W4BAZ, WØAUL, and VE2GM.

—•••—

VE2GM tells of an incident on PQN (Quebec Net) which indicates that a little humor will go a long way toward alleviating the frustrated and exasperated feeling that often follows a particularly fouled-up net drill. PQN had a lot of QRM that night, and this was made worse by the fact that signals were none too good. By the time drill was over, everybody was ready to take up stamp collecting. It was then that VE2CD, the NCS, sent the following message to VE2GM, the net manager: "HR NR 22 VE2CD SVC ST LAURENT QUE NFT FEB 7 TO VE2GM BT HAVE

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for January traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W6CE	45	1036	962	20	2063
W7CZY	57	891	978	11	1937
W2TYU	18	501	445	10	974
WØZJO	25	467	448	15	955
W5GZU	10	440	384	51	885
W5LSN	21	401	395	34	851
W3CUL	108	302	251	47	708
WØHMM	3	340	324	16	683
W2CDQ**	25	333	291	21	670
W2RUF**	36	341	244	31	652
W3UF	32	242	274	42	590
W2CDQ	39	274	213	32	558
W2BO	8	250	246	35	539
W2RUF*	30	278	197	20	525
W1CRW	15	259	227	18	519
W4PYV	18	245	235	10	508
W3NCD	22	244	235	3	504

The following made the BPL for deliveries:

W5MN	76	W6CMN	68	W8HOH	59
W9CMC	74	W4BAQ	64	W6FDR	57
W6YLZ	71	W6NW	64	W4SLJ	56
W7FIX	70	W6IXH	62	WØOOT	53
W9ESJ	69	W2PRE	61		

A message total of 500 or 50 or more *deliveries* will put *you* in line for a place in the BPL. The Brass Pounders League is open to all operators who qualify for this monthly listing.

* November Traffic ** December Traffic

FOUND A NICE QUIET SPOT FOR PQN AT 3490 KCS WAT SAY BT DON."

— ... —

In the recent CD "poll" on traffic and CD Party matters, we received close to 400 return cards so far (mid-February). While the cards are still coming in, the present consensus seems to be, by margins not likely to be overcome by late returns: (1) the term "Brass Pounders League" should be retained; (2) more BPL credit should be given for originations; (3) word counting for message checks should be simplified; (4a) two separate week ends for 'phone and c.w. participation in the CD Party are favored; (4b) most of the gang are *against* dropping the code-proficiency credit in CD Party scores; (4c) the "different stations" multiplier in CD Parties should be removed.

Many letters commenting on the poll card have been received, with several worth-while suggestions coming out as a result. Excerpts from these, and a complete tabulation of returns, are scheduled for the April CD Bulletin.

— ... —

Spring is here, and summer, with its attendant QRN, poor conditions and a multitude of diversions, is just around the corner. During the past two summers it has been noted that the volume of traffic has not declined as in days of yore; the only thing that has declined is the number of traffic-handlers and the number of active nets. August and September are favorite times of the year for country fairs.

This year we are going to try to operate the National Traffic System all summer. The extent to which this will succeed depends on the amount of support it gets. Managers of regional and area nets are now giving consideration to suitable frequencies for summer operation, lining up available personnel and making plans to operate with whatever strength they can muster. It is suggested to all other nets that similar plans be made, if they are feasible, so that the amateur traffic-handling service will not be found wanting during the summer. Let us in on your plans.

PHILIPPINE INCIDENT

A far-reaching network of amateurs relayed vital information and news in the search for the two college professors who were reported missing in the Philippine jungle. The two men, Dr. R. F. Conklin of Springfield, Mass., and Dr. M. Pittman of Chicago, Ill., had gone on a hike in the mountains of northern Luzon where they were attacked by Ifugao tribesmen and killed. Amateurs throughout the States and on Pacific islands relayed information about the two men to their families here in this country.

Dr. Rashevesky, Chicago, Ill., father-in-law of Dr. Pittman, on behalf of the families of the slain men wishes to thank the following amateurs and any others that helped by sending or relaying information: W7MP, W7NQH, W7MZE, W7IOQ, W7NPK, W5IZV/7, W9NLP, W9UCN, W9MDQ, W4EZL, WØWEE, W7NGF, W7WDZ, W7EBL, W7HUL, W8IIP/7, W7NRB, KP4JO, KH6USA, KR6CH, KJ6AF, DU1CI, DU1AZ, DU1AW, and JA2BZ.

CODE-PRACTICE PROGRAM

The following list of code-practice stations should be added to the lists appearing on page 61, Nov. 1949 and page 57, Feb. 1950 *QST*. The W5 stations appearing below are transmitting code practice under a program sponsored by the Sandia Base Radio Club, Albuquerque, N. M.

W3PSU/9 Harry M. Books, jr., 2214 N. Kenmore Ave., Chicago 14, Ill., 28.61 Mc., Mon., Wed., Fri., 2230–2300 CST.

W7QGN, Thomas C. Nelson, jr., 1110 Cedar, Richland, Wash., 3865 kc., Mon. through Thurs., 1830–1900 PST.

W5NXK, J. A. Patalive, 14,150 kc., Mon. 1900–1930.

W5PKC, P. C. Arndt, 7190 kc., Mon., 1815–1845.

W5MSG, E. G. Miller, jr., 3750 kc., 1st & 2nd Wed., 2030–2100.

W5PWD, K. L. Harris, 7200 kc., Wed., 2100–2115.

W5PVM, P. D. Miller, 7120 kc., Wed., 2000–2030.

W5NRP, R. F. Hoffman, 29.0 Mc., Thurs., 1915–1945.

W5OML, R. Wilson, 7200 kc., Thurs., 1900–1915.

W5OIA, H. C. Carmody, 7110 kc., Thurs., 2000–2015.

W5OZS, J. A. Riedel, 7190 kc., Fri., 1900–1915.

W5DEN, L. R. Tipton, 7150 kc., Fri., 1930–1945.

DXCC NOTES

Checking cards for DXCC credit occasionally brings on a recurrence of countrymania, characterized by a convolution in the mind of the person checking such cards as to what QSLs count for what countries. Such has been the case recently with respect to VP2LX, submitted by many as a claim for Windward Islands credit and rejected on the grounds that he was in the Leewards group. The fact that VP2LX had no QTH on his card other than an APO number complicated matters greatly. We have just learned that VP2LX was actually in the Windward Islands, so we invite those who have his card and need Windward Islands credit to submit or resubmit his QSL as the case may be.

DX CENTURY CLUB AWARDS

HONOR ROLL

W1FH.....229	W3BES.....219	W6MEK.....211
W6VFR.....225	W2BXA.....217	WØYXO.....210
W6EBG.....220	W8HGW.....214	W3GHD.....210
G2PL.....220		W3GAU.....210

RADIOTELEPHONE

W1FH.....186	VQ4ERR.....166	W4CYU.....158
W6DI.....177	W2BXA.....162	W9RBI.....158
XE1AC.....172	W1JCX.....160	G2PL.....157
	W8HGW.....159	

From January 15 to February 15, 1950, DXCC certificates and endorsements based on postwar contacts with 100-or-more countries have been issued to the amateurs listed below.

NEW MEMBERS

W4C\Y.....127	W8DAW.....108	W1FTJ.....101
W6IFW.....122	W1JMT.....107	W9VIN.....101
G8GB.....119	W6DE.....105	W1NAV.....101
G6RB.....118	W1IAP.....103	W3DYU.....101
W1TX.....116	W2RQH.....103	PK4KS.....100
W2REF.....111	OZ2LX.....102	W7RT.....100
PAØLR.....110	W5NMA.....102	W6KYV.....100
PAØPN.....109	I1BEY.....102	W5CD.....100

RADIOTELEPHONE

WØPRZ.....111	W5JWM.....102	W9CZC.....101
W4LZM.....107	W5NMA.....102	G8VB.....101
HB9CX.....104	KP4EZ.....101	W9HMG.....100
W8ACP.....104	WØNWW.....101	W8AJH.....100

ENDORSEMENTS

W6TT.....202	W3DKT.....170	W4HA.....139
W6MX.....200	W5GEL.....160	ON4AZ.....138
W7AMX.....200	W2JVU.....160	W9TQL.....133
PY1DH.....191	W9AEH.....156	SM5LL.....132
W6ZCY.....190	W3LBG.....156	W2UEI.....131
VE7ZM.....188	W8KPL.....154	CE3DZ.....130
W5FNA.....186	W5JC.....153	G3AH.....124
WØDAE.....185	W2WZ.....153	KH6LG.....123
W7GUI.....184	VO6EP.....152	W6EHV.....120
W1ADM.....183	W9FKC.....150	W7DET.....120
VE7HC.....180	PY1AHL.....150	W1QF.....120
W3GRF.....180	OK1VW.....150	W8MFB.....114
ZL2GX.....180	W1NW.....142	W2ABS.....112
W2CWE.....180	W2CSO.....141	G3DCU.....111
W2AGO.....171	W8DMD.....140	G8KU.....111
HB9CX.....171	W6CTL.....140	SM6HU.....110
W3OP.....170	OK1HI.....140	W3VZD.....110
WØPNQ.....170	I1OJ.....140	W2GFW.....110

RADIOTELEPHONE

LU6AJ.....156	VE7ZM.....128	W6MJB.....120
W1MCW.....150	HC2JR.....123	ZS6Q.....116
W1ADM.....134	W5ASG.....122	W9UUN.....115
W4AZD.....131	I1RM.....121	W2QKJ.....111
W4HA.....131	W1FFO.....121	W2AEB.....110
	W4MKB.....120	

MEET THE SCMs

Manley W. Haskell, W1VV, Maine SCM, received his first license several years after becoming interested in amateur radio in 1914, and has held the calls W1OL, W1CIN, and W1VV.

In addition to his SCM office, he holds appointment as official 'phone station and emergency coördinator. He formerly held appointment as ORS. He possesses two Public Service certificates, one for his excellent work in handling emergency communications during the 1936 flood in Portland, Maine, and another for operation during the Maine Forest Fire emergency in October, 1947. He is a member of the Portland Amateur Wireless Association and a past-president of that organization.

The rigs at W1VV are VFO 696/xtal-6L6-807-811-p.p. 203As, BC-654, and SCR-522. The receiver is an HQ-129X and the antennas are a half-wave 80-meter, end-fed, and a 2-meter bazooka-fed job. Operation is confined to 144-Mc. 'phone, 3.5-Mc. c.w., and 3.85-Mc. 'phone. A BC-654 and a PE-103 dynamotor are available in case of emergency.

Writing and pistol practice are other hobbies he enjoys; his favorite sports are tennis and fishing.

CODE-PROFICIENCY AWARDS

Have you received an ARRL Code Proficiency Certificate yet? Twice each month special transmissions are made to enable you to qualify for the award. The next qualifying run from W1AW/WØTQD will be made on April 19th at 2130 EST. Identical texts will be sent simultaneously by automatic transmitters. Frequencies of transmission from W1AW will be 1887, 3555, 7215, 14,100, 28,060, 52,000 and 146,000 kc. WØTQD will transmit on 3534 kc. The next qualifying run *from W6OWP* only will be transmitted on April 1st at 2100 PST on 3590 and 7248 kc.

Any person may apply; neither ARRL membership nor an amateur license is required. Send copies of *all* qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the five speeds transmitted, 15 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m., you may try later for endorsement stickers.

Code-practice transmissions are made from W1AW each evening, Monday through Friday, at 2130 EST. References to texts used on several of the transmissions are given below. These make it possible to check your copy.

Date *Subject of Practice Text from February* QST

April 1st: Qualifying Run, 2100 PST, from W6OWP only
April 4th: *A Solution to the Keyed-VFO Problem*, p. 11
April 6th: *A Simple Nondirectional Antenna . . .* , p. 16
April 12th: *Eliminating TVI with Low-Pass Filters*, p. 19
April 14th: *A 2-Meter Station for the Novice*, p. 27
April 17th: *Technical Topics*, p. 34
April 19th: Qualifying Run, 2130 EST, W1AW, WØTQD
April 20th: *TV Interference Problems*, p. 44
April 25th: *The World Above 50 Mc.*, p. 46
April 28th: *"The Land of Morning Calm,"* p. 48

ELECTION NOTICE

(*To all ARRL members residing in the Sections listed below:*)

You are hereby notified that an election for Section Communications Manager is about to be held in your respective Sections. This notice supersedes previous notices.

Nominating petitions are solicited. The signatures of five or more ARRL full members of the Section concerned, in good standing, are *required* on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must have been a licensed amateur for at least two years and similarly a full member of the League for at least one continuous year immediately prior to his nomination.

Petitions must be in West Hartford, Conn., on or before noon on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, and station call of the candidate should be included with the petition. It is advisable that eight or ten full member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reason of expiring memberships, individual signers uncertain or ignorant of their membership status, etc.

The following nomination form is suggested: (Signers will please add city and street address to facilitate checking membership.)

Communications Manager, ARRL [place and date]
38 La Salle Road, West Hartford, Conn.

We, the undersigned full members of the .....
.....ARRL Section of the.....
Division, hereby nominate.....
as candidate for Section Communications Manager for this Section for the next two-year term of office.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence the names of all eligible candidates.

You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

— F. E. Handy, Communications Manager

Section	*Closing Date*	*SCM*	*Present Term Ends*
South Dakota	Apr. 14, 1950	J. S. Foasberg	Jan. 15, 1950
San Francisco	Apr. 14, 1950	S. C. Van Liew	Feb. 15, 1950
Connecticut	Apr. 14, 1950	Walter L. Glover	Feb. 15, 1950
New Hampshire	Apr. 14, 1950	G. K. Crowell	Resigned
No. New Jersey	May 15, 1950	Thomas J. Lydon	July 26, 1950
North Carolina	May 15, 1950	W. J. Wortman	July 26, 1950
Arkansas	June 1, 1950	Marshall Riggs	Aug. 16, 1950

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed in a number of Sections, as provided in our Constitution and By-Laws, electing the following officials, the term of office starting on the date given.

Quebec	Gordon A. Lynn, VE2GL	Dec. 15, 1949
West Virginia	Donald B. Morris, W8JM	Feb. 15, 1950
Georgia	James P. Born, jr., W4ZD	Mar. 8, 1950

In the Los Angeles Section of the Southwestern Division, Mr. Virge A. Gentry, jr., W6VIM, and Mr. Vincent J. Haggerty, W6IOX, were nominated. Mr. Gentry received 289 votes and Mr. Haggerty received 273 votes. Mr. Gentry's term of office began Jan. 25, 1950.

Station Activities

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

EASTERN PENNSYLVANIA — SCM, Jerry Mathis, W3BES — The Schuylkill ARC enjoyed the TVI films supplied by the ARRL. GMK operated portable in the wilds of Bucks County during the CD Party. It's hard keying the bug on the floor. LVF has a pair of 826s on 144 Mc. The York Road RC V.H.F. SS score is 29,454. CUL thinks she won the YLRL YL/OM Contest. We regret to record the passing of HHS, who was well known on all the ham bands in Philadelphia. OHY burned up his TVI filter. What a harmonic! DYL has cured his TVI. The Northeast Radio Club has a Saturday-night QSO Party at 11 P.M. on 28,850 kc. with everybody welcome. CPC made the most commercial-looking low-pass filter that we have seen. The Abington Township Amateur Radio Assn. is planning to give an assembly program at one of the local high schools with ham radio as the subject. The officers of the Association are NDZ, pres.; PSH, vice-pres.; PDJ, secy.; OQG, treas. ELI is on 50 Mc. with f.m., and wonders where everybody is. He has his 28-Mc. rig perking also. New officers of the Philadelphia Wireless Assn. are HHK, pres.; MWC, vice-pres.; Fr. Dennis O'Neill, treas.; S. Bush, rec. secy.; PST, corr. secy.; JWC, membership director. QEZ is a new member of the PWA in Philadelphia. This Club is running an educational program and is interested in training fellows of high school age. Anyone interested may contact JWC. Phone: IVyridge 2-5794W. One drop of water put JWC out of business. A leaky radiator let a drop of water down on the head of his 3C29 while tuning up on 28 Mc. IU is doing a fine job of working across the pond on 160 meters. FLH has cleaned up his TVI. The West Philadelphia Radio Assn. has had a new burst of activity and reports increased attendance at the meetings. LTU did well in his first attempt at v.h.f. in the V.H.F. SS Contest. Traffic: W3CUL 708, PMG 160, NHI 56, WTS 56, PDJ 37, OML 25, ELI 12, PST 10, QEW 10, HHK 1.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, Eppa W. Darne, W3BWT — The Chesapeake Amateur Radio Club celebrated its first anniversary with a buffet supper Jan. 7th at the Lutherville Fire House. The Club is running a slow speed c.w. net on Sundays from 10:00 A.M. to 12:00 noon, using the section net frequency, 3650 kc. The Club members enjoyed a discussion on "Positive and Negative Feed-back Circuits for Audio" by 1OQD/3 at its Jan. 17th meeting. The University of Maryland Amateur Radio Association's present officers are NHP, pres.; OSQ, vice-pres.; OKB, treas.; Bob Buxbaum, secy.; ONP, Myron Zuk, and Robert Buxbaum, sgt. at arms; JES, PHW, and LJV, traffic committee. Meetings are held Wednesdays in the Old Gym Bldg. at 7:30 P.M. The Club with the call EAX meets Swing Shift Net daily and works in the MARS Net as A3EAX. Washington Radio Club's Jan. 14th meeting featured a talk on "Loran" by Commander H. D. Sielstad, PWC, U.S. Coast Guard, and a Sperry receiver indicator was demonstrated. At the second January meeting the Club held another of its famous spare gear auctions. A new radio club in the Baltimore area is the Veterans Radio Club. The call OEU has been assigned, and the membership is building rigs for 7, 14, and 144 Mc. Traffic manager for the Washington Mobile Radio Club, ENR, called an unannounced emergency drill on Jan. 24th for exchange of traffic between Baltimore and Indian Head, Md. Within 30 minutes, 12 mobile stations responded and were on the air. KBE, operated by ENR, was NCS for the drill. The Rock Creek Amateur Radio Association's meeting of Jan. 27th featured a talk by Phil Robinson, EUQ, on TVI, and the elimination of same. The Capitol Suburban Radio Club publishes a Club Bulletin called the *News Letter*, editor KNU, with very nice editorials and items of interest about the club and individual activities. The membership recently conducted an auction of radio gear at CG's shack. At recent meetings, one of which was held at PZA, the Red Cross National Headquarters radio station, the membership discussed joining up with the operations of this station which is for joint Naval Reserve, Red Cross, and ARRL National Emergency Net operations. NNX schedules VE6GH on 29-Mc. 'phone. QL has been in the hospital because of an injury to one hand. KQ recently took a trip to Florida. PSP has a "boomerang," which is an adaptation of the Monitone recently described in *QST*. JE, while using his mobile rig in Virginia, contacted 9YEF, who was being interviewed by a newspaper reporter. Karl also was interviewed "over the air" and the article appeared in 9YEF's local Kansas newspaper. DQB now is OO, Class IV. LVJ is active after a stay in Massachusetts and Florida. MTQ now is located in Monmouth Beach, N. J. KRJ is installing 28-Mc. gear in his car. JJD operates on 3.85- and 28-Mc. 'phone. KMN, DQB, and VES are newly-appointed ORS. EYX schedules 6WAI. QCB is on 7 Mc. with 20 watts. JZY is back on the air using 3.85-Mc. 'phone. FQZ has a 750-watt rig on 3.5, 7, and 14 Mc., also 300 watts on 28 Mc. EQK has his new final in operation. Traffic: W3UF 590, ECP 200, KMN 187, AKB 95, EAX 82, LFG 67, BWT 31, NNX 30, CIZ 27, EQK 14, JHW 14, MCG 12, LVJ 5, VES 4.

SOUTHERN NEW JERSEY — SCM, Dr. Luther M. Mkitarian, W2ASG — The Lakeland Amateur Radio Assn., Inc., meets the first and third Wednesdays at Kussath Hungarian Hall, Kussath Ave., Wharton, N. J. Officers for 1950 are FQS, pres.; PEV, vice-pres.; YCX, secy.; PFZ, treas. The Atlantic Radio Club meets the second Wednesdays at Red Cross Headquarters, 1212 Atlantic Ave., Atlantic City. PXZ is the secretary. Visitors are always welcome; visit the Club as often as possible. HAZ is rebuilding a TVI-proof rig. ZI is a new NCS for TCPN (Trans-Continental 'Phone Net). K2AZ is EC for Atlantic and Cape May Counties. ZYX says that he is playing with his TV more than his rig. OEW is Morris County EC and is building an emergency rig for Red Cross Headquarters. RFF has completely recovered from his long illness and is back in circulation. STU has a new problem to lick; it is HAI (hearing-aid interference). Club secretaries, please let me have all the news on or before first of each month. Traffic: W2ORS 14, ASG 12, RFF 5, HAZ 4, YZX 2.

WESTERN NEW YORK — SCM, Harding A. Clark, W2PGT — SEC: SJV. RM: RUF. The Clayton Radio Club is building kw. rig. CFY reports that CWZ and DEP are new calls in Malone. UYG keeps schedules with Marine Corps and Coast Guard Nets. QHH has retired the 6L6, now is using an 807 and quickly adds 12 new countries on 3.5 Mc. for a total of 65, and worked KV4AA on 160 meters. DEQ is new call in Niagara Falls. QNA reports more stations in V.H.F. SS this year than any previous year. SO has returned to California. YRF received Class A ticket. ATC worked 10 countries on 28 Mc. with 10 watts. ZRO runs 7 watts on 160 meters. CCZ and ATC are thinking about 1215 Mc. WVC spends spare time working DX on 14 Mc. QHH received 180 endorsement on DXCC in spite of constant S7 line noise. The Niagara Frontier 2 Meter Net held a drill and exchanged traffic with 144-Mc. nets in Broome, Tioga, and Tompkins Counties — the relay being made on 3.5 Mc. This gang has high hopes of a state-wide 144-Mc. net in the very near future. If you are on 144 Mc. or expect to be and are interested, please contact FCG or SJV. UPH, ex-SCM, of the section, has been working DX and has DXCC. The only time QEW is heard is when he is grabbing a new country. Ditto for QJM. QCF uses s.s.s.b. between DX contacts with FB results. FBA uses a four-element beam on 7 Mc. UPH is chairman of the Amateur Radio Exhibit at Kodak Hobby Show scheduled for March 27–31. SWC, ex-VE8MC, gave a talk to RDXA on his experiences in the Arctic region. The Niagara Radio Club has secured the support of the local State Senator to have auto plates with amateur calls. QY has been making discreet inquiries about audio. SZL has his sights on DXCC. QCP-ICE lost his beam, recently described in *QST*, in a wind storm. SCZ is on 144 Mc. with a cubical quad. RARA Ladies Auxiliary meetings are becoming family affairs with XYLs, OMs, and jr. operators attending. The Syracuse Amateur Radio Club is planning a booth at New York

State Fair in September. Plan on attending the Rochester Amateur Radio Assn. hamfest May 13th. Traffic: (Jan.) W2CDQ 558, RUF 363, SJV 140, FCG 100, YGW 74, PGT 50, FE 45, FEB 41, QHH 37, UYG 34 RUT 26, UTF 16, YRF 5. (Dec.) W2CDQ 670, RUF 652, PGT 108, YGW 94, FEB 67, UYG 64, QHH 35, FE 34, SJV 34, YRF 32, UTF 29, WOE 14, FCG 12, UBU 4. (Nov.) W2RUF 525, CDQ 291, YGW 98, QHH 33, PZC 29, SJV 22, YRF 21, PGT 18, WOE 15, UBU 8, WZQ 7.

WESTERN PENNSYLVANIA — SCM, Ernest J. Hlinsky, W3KWL — We heard from the Fort Necessity Amateur Radio Assn. and find that things at PIE are perking up as usual. CAV is becoming more active. LAC is trying to foolproof his rig of TVI. RUC is now on 28-Mc. 'phone. The Amateur Transmitters Assn. sends in its *ATA News*. The Club's programs are the envy of all clubs. MLK gave an excellent talk on WWSW. The ARRL film on TVI proved a success, with a capacity crowd to witness it. Another new kink in its club activities is the handling of a rifle match by ham radio. Credit for this goes to CEO, NKI, MTA, OZT, OEP, 2CDW, KSR, YDJ and a host of Detroit amateurs. NUG and SCW did the official monitoring of the match. The ATA is sponsoring a QSL contest among its club members. The 420-Mc. gang is going full guns with JAV, OMY, CTN, MMV, and NKM doing their stuff. How about some of that activity on 144 Mc.? New members of ATA are BWZ, RWT, PUI, and NBP. Two new XYL operators heard are AAX and PWQ. Your SCM wants to take this opportunity to extend his appreciation to the Western Pennsylvania boys for their fine showing in the SS Contest. We hear that IYR is rebuilding mobile rig. AER finds 14-Mc. DX opening up. UHN has been checking into W. Pa. Net. Incidentally there is an urgent call for some reliable station to report into Trunk Line Atlantic-Pacific nightly. If interested, see NUG or GEG, Route Managers. GEG makes BPL for the second consecutive month. GEG and 8GLX terminated a QSO over 12 years ago and while GEG was working in the CD Party he heard someone calling him. It was 8GLX and, to top it off, it was the first contact with GEG for 8GLX since his retirement. Around Mercer County the TV bug got into CJF's hair. The Mercer County Radio Assn. was visited by a student engineer now located at Westinghouse who is from India. In closing I want to remind you to look at your official appointments and see if they need endorsement. Traffic: (Jan.) W3NCD 504, NRE 462, NUG 96, GJY 70, PAB 22, UHN 22, LQQ 7, AER 6, NCJ 3. (Dec.) W3NUG 81.

CENTRAL DIVISION

ILLINOIS — SCM, Lloyd E. Hopkins, W9EVJ — Section nets: IEN, 3940 kc.; ILN, 3765 kc. SEC: QLZ. PAM: UQT. RMs: SXL and SYZ. After an unsuccessful try on a new frequency the ILN Net has returned to its original 3765-kc. spot. ULO bought a new NC-57 and is rebuilding exciter. CTZ is going to night school at Millikan University. KQL finds his new job and ham radio don't mix very well and has curtailed his activity. HOV is spending his time on 28-Mc. 'phone and reports new officers for Hamfesters are YZV, pres.; HOV, vice-pres.; DKA, treas.; ZIW, corr. secy. and ZHR, financial secy. PHE has a new electronic bug and 7-Mc. folded dipole. FHV is trying to get moved into new home. NUX is dodging TVI by monitoring various nets and operating only when necessary. ZSN has new 3.5-Mc. center-fed "V" antenna. BRX spent some time on 3.85 Mc. with 650 watts. BPU and his XYL are driving to Arizona and will be mobile on 28 Mc. YTV is sweating out rig troubles. HKA reports AEC members in Iroquois County voted to form a radio club with SD, pres.; and HKA, secy.-treas. JNC is secretary of North Suburban Radio Club of Winnetka. NIU reported eavesdropping on ILN. TAL is equipped to operate on all bands from 10 to 160 meters with an NC-183 receiver. CBA got a TV receiver to study TVI! UBP has new final amplifier finished and expects to run 450 watts with proper antenna. GDI enjoyed the CD Party and reports OO notices are appreciated. DUA may be found on USCG auxiliary net Friday nights with EBZ as Net Control. HPG says accuracy in frequency measuring is improving with better equipment. FRP has SX-72 for stand-by purposes. LNI is working swing shift and finds little time for radio. BON wants more activity on 50 Mc. JMG needs contributions for *ILNuz*. CMU has been under the doctor's care for several weeks and reports feeling better. ACJ sends report on the IVRA gang: IQC is building a new rig and making use of 160 meters, along with KTA and PBY. JVC is sweating out the new HRO-50. OBB is fighting oscillator trouble. DLO went visiting in the W7 district. LHK has antenna troubles. BJA was kept busy constructing oscillators. IZY gave up 'phone for c.w. HCP is having feedback troubles. HKI has a good beam but is trying to feed it. YNE received Collins 32V-2 rig from Santa. KTA is a new member of IVRA. ZEN is taking a whirl at 3.85-Mc. 'phone. QLZ is sporting a new car. NOO has 813 final, all bands. Traffic: (Jan.) W9FLQ 194, CMC 187, SXL 131, EVJ 122, DUA 78, SYZ 57, CBA 54, MRQ 43, LIN 34, FKI 33, JMG 31, IIZ 29, UBP 28, CMU 25, CTZ 20, FRP 19, KQL 15, ZPC 14, ASN 11, JNC 8, HOV 7, ZSN 7, BPU 5, ULO 5, OUR 4, BON 3, TAL 2, YTV 2. (Dec.) W9NUX 30, AQH 11, HOV 11, BPU 10, OUR 4, BRY 2.

INDIANA — SCM, W. E. Monigan, W9RE — As this is written, we have just passed through a period in Indiana of floods followed by sleet storms with all the worst that winter can throw against us. It certainly was a period that showed the value of emergency equipment and organization. Let each of us check our portable equipment and register with PRO, Emergency Coördinator. IFX has a yen for 144 Mc. GTA is putting out code practice on 7.2 Mc. Wed., Thurs., and Fri. at 10:00 P.M. EST. Election of officers at Muncie leaves DOK as pres.; OMD, vice-pres.; Peggy Coulter, secy.; YHA, secy., HJJ, act. mgr. PHV gave a demonstration of s.s.s.c. to the Muncie Club. DGA has a job with the Police Radio at Evansville. HQF is new editor of TARS *Sparks*. NEC is forming 28-Mc. net. Officers of the Indianapolis Radio Club are JJC, pres.; Elmer Marchino, vice-pres.; APJ, secy.; FYQ, treas. DHJ likes 144 Mc. TT is planning a new antenna, and tries 7 Mc. besides QIN and TLJ. EGQ reports bugs in the transmitter. BKJ says the wind blows too strong in Fort Wayne and bends his 14-Mc. antenna. Field Day plans are being stressed in South Bend. Organization of a committee is completed and tentative plans are ready for approval. Galen Miller is new head of the Public Relations Committee. MYI has been elected EC for the South Bend area. EXT is one of the finalists in the General Electric Science Scholarship Awards. GNR finds that merely moving into an area will increase the TVI. (Note: Wonder what will happen when he gets on the air). Traffic: W9QLW 608, DGA 508, TT 366, BKJ 98, RCB 78, DHJ 75, JTX 54, MKM 29, RE 18, DOK 14, NH 7.

WISCONSIN — SCM, Reno W. Goetsch, W9RQM — WIN has shifted frequency from 3775 to 3625 kc. HUJ is looking for 50-Mc. schedules. Power at FXA's is now up to 150 watts. Ice broke down the 160-meter antenna at HDZ. ANM received ORS and OPS appointments. IQW has been acting as liaison between BEN and WIN Nets. UFX rebuilt speech to include clipper and changed 14-Mc. beam to wide spaced. Net certificates (BEN) have been issued to PFK, DLY, EFR, MPO, LUQ, and IQW. DJV has assumed duties as Assistant Secretary at ARRL Headquarters. HDW, EGZ, and IZE are new AEC members. Asst. Director FMH made presentation of ARRL charter to M. & M. Club at a dinner Jan. 17th. ZPU and CBH have Class A tickets. New officers of FLARC are RNX, pres.; HMG, vice-pres.; RBI, secy.; WWW, financial secy.; FCA, GKK, and HZS, directors. BVX made 350 contacts in 35 states in 10-meter WAS Contest. RBI has 204 countries on c.w. and 166 on 'phone. BZU renewed OES appointment. Milwaukee AEC is organizing a special mobile net. Mancorad is working out an emergency equipment set-up with Red Cross. Stout Institute Radio Club elected GIO, pres.; GPC, vice-pres.; KWI, chief op.; CRQ, asst. chief op. CPB is the club station, with 500 watts to 813s and 838s. OVE has a new beam on 28 Mc. OMO is mobile on 4 and 28 Mc. KQB and RKT have been checking in on WIN. Mancorad and Lakeshore Amateur Radio Club handled test traffic for Red Cross. Milwaukee School of Engineering Club (HHX) elected HXV, pres., and AWY, vice-pres. A new club is being organized at Sturgeon Bay under the guidance of CTH, JM, LIK, ITP, and UIM. With all TVI licked, LFK is back to 300 watts. WEN received a card from JA2AZ to complete 7-Mc. WAC. Traffic: (Jan.) W9ESJ 479, CBE 454, SUF 382, HUJ 84, FXA 72, CWZ 63, HDZ 52, AEY 48, DND 31, LFK 31, UIT 29, YCV 29, IVE 28, MUM 24, ANM 22, SFL 21, IQW 11, RKT 7, UFX 7, WJH 5, BZU 1. (Dec.) W9IVE 46, EIZ 11, WJH 6.

DAKOTA DIVISION

NORTH DAKOTA — SCM, Rev. Lawrence C. Strandenaes, W9JWY — Our former SCM, GZD, now is 8EZY in Benton Harbor, Mich., as engineer for the Heath Co. JPW has a new jr. operator. PQW still is threatening a kw., this time from New England. KZL is in Golva until April. ZNM and KAI, of the Dickinson gang, have been in Redwood Falls, Minn., for some time. Twenty-three stations are on the roll call of the 160-meter Great Northern Net, and NCS EFJ, of Edmore, advises FB activity on Tues., Thurs., and Sat. at 7:00 P.M. on 1985 kc. All 160-meter stations in the section are encouraged to join in. VAZ is in California with Consolidated Aircraft. Most of the Grand Forks boys are on 28 Mc., and OZY finally got on with a pair of 807s. OCI is active on 160, 80, and 10 meters. TNL shows off new p.p. 807 rig on 28 Mc.; he is the new president of the Jamestown Club. Traffic: (Jan.) WØKZL 15, JWY 10, CAQ 2. (Dec.) WØJWY 21, CAQ 12.

SOUTH DAKOTA — SCM, J. S. Foasberg, WØNGM — The Howlin' Wind Amateur Radio Club held its first anniversary meeting and to celebrate the event put its own station, AAI, on the air. ORO, in Huron, put the club transmitter on 7 Mc., called a few CQs with no results, then listened on 3.5 Mc. Hearing the c.c.o. he thought it might be on 3.5 Mc. so he called a few more CQs but still without results. The next night, with the help of PVE, he did have a few good QSOs. He now blames the high line noise level in the receivers. The 'phone net is having good turnouts but a program to keep up the interest in the net is needed. Suggestions will be welcome. OLB sends out a special plea to all South Dakota hams to monitor 3720 kc. each Mon., Wed. Fri. at 1900 CST to get used to the procedure and join up. WUU has a new "plumber's delight" on 28 Mc. Traffic: (Jan.) WØOLB 27, GCP 19, FJS 6. (Dec.) WØOLB 52.

MINNESOTA — SCM, John B. Morgan, WØRA — The St. Paul Radio Club did a fine job of traffic control and direction in the annual St. Paul Winter Carnival parade and the torchlight parade two days later. SMT, UYJ, TOZ, and HKF were the mobiles, operating on the St. Paul general frequency of 29,640 kc. ALI is a newcomer and is doing OK on 28-Mc. 'phone. RXL has a new exciter using a 35T. EA has a new set of poles holding up his wire, but they are set in the ice of the lake! PNQ runs an 833 into a three-element on 14 Mc., and picks off the DX. The Twin City Mobile Gang is the name of the mobile units from both the Minneapolis and St. Paul Clubs. The Minneapolis Club is conducting theory and code classes every Thursday at Downtown YMCA, 30 South 9th St., at 8:00 P.M. DGR, formerly W9, now is WØ. QIN has his new all-band rig working. WYT is on 28 Mc. with an XE-10 rig in the new cellar. JVD has a rig installed at his filling station so as not to miss any DX openings. NRV has a 274N in his gas department trouble truck to get calls from local police station. EPZ is using 274N rigs on 3.5, 7, 14, and 28 Mc. DOQ has a new Johnson Viking I. KYE is back on 3.5 Mc. after a long absence. NJQ has his Class A. The Worthington Amateur Radio Club has been formed with NJQ, UMD, TGF, GGD, LCM, and WKL. New OPS in the State are FIT, CLU, MXC, IXR, BGY, BOL, and UCV. Recent ORS additions are EA, GHN, EHO, LDI, PNQ, RXL, BOL, and SIM. UYJ is EC for the St. Paul Club and Ramsey County. SZZ is Asst. EC at Chippewa City. Following are new ECs in their respective counties: OLJ, FIT, EHO, and EA, in Stevens, Freeborn, Morrison, and Beltrami. The entire State is being redivided into county areas instead of sections. AEC membership now includes 116 regular and 50 supporting members, of whom approximately 40 are mobile equipped. BOL, the SEC, reports excellent coöperation from all groups, and a marked upswing in interest from smaller units. Traffic: WØGHN 118, RJF 78, MXC 75, RA 54, EA 43, CLU 33, RPT 32, RXL 29, LDI 26, IXR 25, BOL 23, UCV 15, FIT 10, PNQ 8, CWB 7, EG 6.

DELTA DIVISION

LOUISIANA — SCM, W. J. Wilkinson, jr., W5VT — Well, here 'tis just about fishing time again. Not such a rough winter down this way so maybe some of the boys got in lots of ragchewing, DX, and traffic. However, very few of them took time out to let the rest of us know what they have been doing. That also applies to yours truly, but almost everyone knew what I was up to. Will have the old rig back on very shortly, though, so look out all you contest guys. KYK still is going strong in old New Orleans and has applied for renewal of his ORS appointment, along with GHF. CGC is renewing his OBS appointment and is going in for the CD QSO Parties. JET (ORS) has been very QRL at the drug store and has not much time for operating; however, he still finds a little time for 7 Mc. LQO has been trying to work DX on 28 Mc. ISF has received his B.B.A. degree from Tulane and now has more leisure time for radio. You can find Howard on 14 Mc. KOU expects a discharge from the Army soon and will return home to NOLA. No word has been received for a long time from KTE and BSR but suspect they are busy; KTE is with the Rebel Net and BSR is occupied with Income Tax returns. MJT has been trying to get started again and perhaps it won't be long until he can be heard on some band or other. Well, as previously said, will be on with VT again soon and until then here's 73 to all.

MISSISSIPPI — SCM, J. C. Wallis, W5DLA — The Keesler Air Force Base Club has requested ARRL affiliation. The Pascagoula Club recently was reorganized. QNS is sporting new beam. OVA has TVI troubles. HRW is on 14-Mc. 'phone and c.w. PJQ and PNA now are Class A. OOA and FPE handled traffic for river engineers during an ice storm in the Memphis area. PFC, JIP, NRW, and CQJ are mobile on 28 Mc. PRB/5 is on 28 Mc. at Millsaps; PRB and PNA are assistant operators. The Jackson Club meets at the QTH of NLP. JTI works Memphis and Baton Rouge on 144 Mc. The Jackson gang works the following on 28 Mc.: OTD, Crystal Springs; POE, Brookhaven; PYQ, McComb; NIV and NIQ, Vicksburg; OZK, Yazoo City; NPO, Flora; QGE and NYH, Lexington. PFC has new 129X. DOL has new NC-183. OGN made Class B. WZ is heading the drive for a section c.w. net on 3.5 Mc. Traffic: W5JHS 180, WZ 56, DEJ 50, DLA 22, KYC 20, DOL 19, LPL 17, ANP 8.

TENNESSEE — SCM, Ward Buhrman, W4QT — EC reports in January were received from BAQ, ETN, HHQ, PSB, FLW, and LCB. Another ice storm fouled up wire communication facilities in Memphis and provided work for the AEC there. A detailed report has been submitted by BAQ. Many expressions of appreciation and commendation were received by participating amateurs, from railroad and other agencies whose normal communications were supplanted by amateur radio. PL continues to improve. FDF spent a week end in Chattanooga and visited the gang in that sector. CZL is designing fancy beam with intention of catching up with some elusive 14-Mc. DX. The Fountain City Club was host to visitors from Chattanooga and Oak Ridge. NNH is building some new rigs. NNJ is improved and batting the traffic around as usual. He reports the Navy gang around Millington is on the upswing, with a reorganized club planning rigs on several bands (club call is ODR). NZG is new ORS. NJE works DX with his 28-Mc. mobile rig. Several Oak Ridgers participated in a motorcade with the objectives of catching up on 28-Mc. mobile operation and visiting various hams at odd hours. Mission accomplished. All Tennessee hams interested in a slow-speed net, please contact NNJ, of Millington. Traffic: W4BAQ 357, LNN 185, NZG 178, CZL 78, NNJ 75, AEE 49, FCU 33, LHQ 23, NJE 10, FLW 8, NNH 6, PHY 5, NPS 3.

GREAT LAKES DIVISION

KENTUCKY — SCM, Dr. Asa W. Adkins, W4KWO — It will be necessary for me to mail my report on the fifth of each month. Please send your traffic and activity reports to arrive in Hazard on or before that date. KYN and BGN are in full swing and can help each other. Use them. KYX, 145.8 Mc., 8 P.M. Mon., Wed., Fri., 2 P.M. Sun. BPE, KMX, KLP, MKJ, NVZ, OXC, JAR, 8ABA/4, 9FXR (NA) Interstate Net NCS Mon., KLP; JAR, alternate; Wed., OXC; Fri., MKJ; Net Mgr. Sun., 9FXR. MKJ is sponsoring a 2-meter contest open to all net members. The prize will be a sixteen-element stacked array for 144 Mc. For further particulars contact him. In the VHF Contest MKJ's results were 18 QSOs, 4 states, 144 total. JDN, Erlanger, is on almost every night. NJD is on in Greensburg. RAE is a new ham in Henderson. JQY is visiting in Henderson. OGB is big business on 28-Mc. 'phone patch from MM stations. All Owensboro amateurs were busy during the flood. PDW and NIX operated NIX/4 at Calhoon flood area on 4085 kc. MARS. BXU killed his harmonics, from the air-port I mean. VD reports he will be on KYN soon. FKM's antenna still is hanging across the house. Big Sandy Valley is not too well represented in traffic reports. These boys are doing the work but are too shy to advertise. Traffic: W4BAZ 203, JQY 137, CDA 40, MWX 36, NIX 26, NNC 23, ODL 23, BXU 22, MMY 21, KWO 20, FKM 9, VD 9, JTB 6.

MICHIGAN — SCM, Robert B. Cooper, W8AQA — Asst. SCM c.w., J. R. Beljan, 8SCW. Asst. SCM U. P., A. P. Kohn, 8TTY. SEC: GJH. RMs: UKV, TRN, and NOH. PAM: YNG. AYV is new ORS and BJD now is OO Class III and IV. DLZ has a new vertical antenna on 28 Mc. and new Class A license. UAL is conducting code class for the GRARA while AKI has a class in progress on 28 Mc. DSE is working DX on 7 Mc. and reports AKP is building a new rig while EVP is dividing his time between 3.5-Mc. c.w. and 28-Mc. 'phone. ZCH reports the CAP Net on 148.10 Mc. the only regular activity. CRH reports the need of an 8-Mc. crystal the only detriment to the operation of a stacked five-element 144-Mc. beam on top of his 28-Mc. beam which is 54 ft. high. LLD regrets that his working hours prevent his active participation in the traffic nets. GJX has been reporting into the Buzzards Roost which is making good use of that new Class A. RJC has arranged his schedules to QSP anywhere in the U.S.A. or Possessions. ZWM is using a new HT-9 with a Meissner Signal Shifter and now is N9WAU in the USNR. WXO reports the Flint area 28-Mc. Emergency Net operates on 29,480 kc. EXZ is looking for a Mon-Key but his present 3.5-Mc. c.w. signals are above reproach. MHH is working on a new rig using a pair of 4-125As to be modulated with a pair of 810s. MQU and QBO are doing some very fine 3.85-Mc. mobile development work and their antenna performances warrant some analytical consideration. OAF reports his antenna gathered over ½ inch of ice during a sleet storm without any apparent damage. ZDF is trying to make his German receiver

operate an SM40 "S" meter. ENT has a 20-w.p.m. Code Proficiency endorsement. YLA is getting his share of SWL cards from UA1, 2, and 3. TNO is building an 18-tube bandswitching receiver, with a.m./n.f.m. and accommodating 6 bands from 500 kc. to 42 Mc. UKV reports his new antenna is ready for erection. TTY reports a contact with DQB, who was isolated by very bad snow drifts, and after contact with the Road Commission arranged for a rotary snow plow to open the road and permit a race with a stork. Traffic: (Jan.) W8NOH 264, SCW 246, RJC 231, ZWM 97, WXO 60, AQA 51, ATB 50, AYV 48, UKV 45, YNG 38, CRH 32, DOI 24, URM 16, TQP 13, EXZ 12, LR 11, MHH 11, FX 9, BVY 8, EJD 8, MGQ 8, OAF 7, ZDF 7, ENT 6, ZBT 6, DLZ 5, DWB 3, YLA 2, EGI 1. (Dec.) W8ZWM 210, AYV 30, YLA 6.

OHIO — SCM, Dr. Harold E. Stricker, W8WZ — Asst. SCMS, C. D. Hall, 8PUN, and Charles Lohner, 8RN. SEC: UPB. RM: PMJ. PAM: PUN. New appointments: ORS — VZ. OBS — WAV and STQ. OPS — ZOF and VZ VZ renewed his ORS and OPS appointments after a lapse of about 15 years. Don't forget the Great Lakes Division Convention in May. Thanks for the DARA *QMN Bulletins*. All hams wishing to join the AEC, please send your application blanks to the SEC. We can use more ORS and OPS. Any ARRL member is eligible. At the last meeting of the CORC the principal speaker was ENH, who talked on TVI causes and treatment. Clem demonstrated the Drake filters and, seeing is believing, they work. You would be surprised at the number of reports that I receive that say, "No activity — TVI." We licked BCI, and if we go at it *right*, we can lick TVI. TV interference and elimination was the principal subject discussed at the last meeting of the Columbus Amateur Radio Assn. OVL gave the boys the dope. The Columbus Club gives code and theory instruction every Wednesday in the Virginia Hotel. WAB and BBK were temporarily inactive because of appendectomies. From the *Mike and Key* of the GCARA: OVL again spoke to the club on TV interference and elimination. New officers of the QCEN are DEU, pres.; VUV, vice-pres.; EAI, secy.; and 4IYH, treas. A talk on TVI causes and cures was given to the Club by EYH. From the *Q-5*: EQN, NCS of the Dog House Net, has received his 20-w.p.m. Code Proficiency endorsement. JRG has a new transmitter practically completed. WXG is handling code classes and also sending code on 144 Mc. From the *CAC* of the Cleveland Area Council: The Hamfest will be held on Apr. 8th or Apr. 15th. From the *R-F Carrier* of the Dayton Amateur Radio Assn.: ARRL films on causes and cures of TVI were shown at the February meeting. ZQU talked on pentodes at the previous meeting. GE has a new YL. SYL is selling his complete 500-watt rig. LAX has some good dope on taking vibrations out of a beam contact. From the *Voice-Coil*: The Haywire Hookup Club of Niles has 13 members who get together for bull sessions. If interested, call ADX. BIH is a new ham in Youngstown. TVI is bad in Newton Falls, according to MTC. BXA and FZJ are off the air, MTC is rebuilding. HSP is on only after TV hours. It is estimated that 5,000,000 TV sets will be built in 1950. You may not have TVI now, but I'll bet a bundle that 99.9 per cent of the hams will be exposed to it sooner or later. *Why not get ready for it now?* SJF made BPL for the second consecutive month. UZJ has new YL No. 1. VZ has new 10 and 20 beam. AQ must have TVI licked, as he is active again on 3.5 Mc. BEW worked the West Coast on 3.5 Mc. in daylight (both ends) with 45 watts. That is DX. PUN reports a very interesting experiment, 7IKY on s.s.s.c. and carrier was furnished by VE7US; thus the rest of the net could read him. DAE is ESN manager and TLAP and BN NCS and also works 8RN, TLL, and SSN. DAA is ex-6GUU and is located in Athens. BOS is building s.s.b. rig. EXI, Akron area EC, is getting a local 3.5-Mc. c.w. net going for AEC members. YFJ has new Meissner Signal Shifter. Please look at your certificates and send them in if due for endorsement. Keep those station activity reports coming in. Traffic: W8SJF 367, DAE 168, UPB 95, EIU 70, CBI 48, RN 39, PMJ 33, BEW 24, PUN 24, QIE 23, WE 22, K8AIR 18, W8DXO 15, ZOF 10, ROX 9, YFJ 9, YCP 7, AQ 6, VZ 6, WAB 6, OUR 5, ZMJ 5, STQ 4, BFH 2, DZO 2.

HUDSON DIVISION

EASTERN NEW YORK — SCM, Fred Skinner, W2EQD — SEC: CLL. High winds around the Schenectady-Albany area damaged the antennas of GMU, CRE, EFU, SFK, and PFU. GYV is back on 144 Mc. with new modulator. EQD now is using an automatic bug. GTC received a Section Net certificate. ORS appointment renewals were made for CLL and WIK. Traffic: W2CLL 214, PHO 130, TYC 95, EQD 75, BSH 59, RH 19, GYV 2.

NEW YORK CITY AND LONG ISLAND — SCM, George V. Cooke, W2OBU — SEC: BYF. RM: TYU. The AEC situation in the section is brightening up considerably. Nassau County EC, FI, reports that the weekly 144-Mc. drills are well attended, and Manhattan EC, WHB, tells us that 80 per cent of the Manhattan AEC is equipped with emergency power. ESZ is the new EC for Rego Park and Middle Village, and has started to form an active group based largely on the membership of the Trylon Radio Club. The Southern Queens AEC group, under EC_NZJ, announces drills on 147.05 Mc. Mondays at 2100. A Brooklyn EC is badly needed, says OHE, Acting EC, who requests action to be relieved of the job because of pressing work. Who will volunteer? Suffolk County now is activated and a group formed for emergency work. Liaison between counties and inter-bands has been set up and good work is being done. With Field Day coming up ECs are provided with an excellent tool. Make 'em sign up in the AEC before they sit down at the operating position. WHB, Manhattan and Bronx EC, would like to see more stations calling in on 3710 kc. at 2000 Fridays. NLI now has its new bulletin, with TYU, RM for the Net, as editor. The bulletin is a swell job and can be had by contacting the NLI Net on 3710 kc. at 1900 Mondays through Fridays. From the traffic listed the NLI Net has plenty to do and outlets are needed around the eastern end of the Island. PRE now is the official RM for 2RN. MSK received OPS appointment and promises lots of activity on 14 and 28 Mc. The Suffolk County Radio Club's officers for '50 are: AJF, pres.; WDP, vice-pres.; HCA, treas.; MZB, secy. The Federations party in January was a huge success due to the fine demonstrations of TVI by UOL and a TV transmitter show by LMP. YSL announces a 144-Mc. MCW AEC group formed in Bethpage and surrounding towns using the net call of NSN. OXM, EC for Mineola, is acting as NCS. MWA is converting APS13 for 420 Mc. Does anyone have a schematic for it? MHE, BQP, UMD, and ZAI have formed a net on 29,400 kc. and has established liaison with the NLI Net for exchange of traffic. YSY announces formation of the Eastern Amateur Radio Club in Eastern Brooklyn with hopes for affiliation soon. Licensed amateurs and SWLs are invited to visit. The Empire City Club now meets at P.S. 173, Manhattan. ZKK worked hard for his Class A ticket. TZU and OBH finally made a QSO on 220 Mc. BXS is a new "ham" in Bethpage. ZDE has been appointed OO, Class III and IV. Steve now is Weather Bureau Regional Coordinator for the local district. PF got himself a 32V-2 and now is completely TVI-proof. ESO finally got a 66-ft. Marconi up after using fire-escape antenna for many months. TUK participated in V.H.F. and SS Contests, and CD Party and made first QSO on 14-Mc. 'phone using 20 watts to 807. EC says the January CD Party was the best ever; he took time off long enough to work F9IZ on 7 Mc. RQJ and UQD both play in an orchestra for "Big Town" on NBC. BHP now is DL4BS and is working 14 and 28 Mc. Traffic: W2TYU 974, BO 539, PRE 438, VNJ 151, EC 125, OBU 85, JBQ 75, OUT 75, BGO 42, SJC 42, ZDE 39, TUK 14, PF 12, BQP 8, WHB 8, YDG 6, ESO 4.

NORTHERN NEW JERSEY — SCM, Thomas J. Lydon, W2ANW — The N.N.J. c.w. net meets daily except Sunday at 7 P.M. on 3630 kc.; the 'phone net every Sunday at 9 A.M. on 3900 kc. VYB received his WAC certificate. BFP now is on 7 and 14 Mc. and has worked his first DX station. DJT is experimenting with antennas. He regularly schedules stations in his home town of Searsport, Me. YOB is recovering from a stay in the hospital. HXU is active on 14 Mc. ADP and AGU are back on the air. KMK is mobile on 3.85 and 144 Mc. New officers of the Monmouth County Amateur Radio Assn. are BTG, pres.; LNK, vice-pres.; PWX, treas.; WRG, secy.; and SOY, chief engineer. BQU was elected president of the Long Branch Sr. High School Radio Club. ZT now has new 220-volt three-wire supply and again is very active. BRC is back on the air. MIG is off the air because of school activities. ZA now is a Silent Key. He passed away Jan. 29th in Miami. UMB and his daughter, Helene, received an excellent write-up and station description in EKU's column of the *Newark Sunday News*, January 29th. Traffic: W2LMB 49, NCY 45, NOZ 29, OXL 26, WOJ 17, KMK 8, NIY 3, ZEP 3, CJX 2.

MIDWEST DIVISION

IOWA — SCM, William G. Davis, WØPP — SQQ worked JA2AZ and XE2W on 3.85 Mc. FDL is rebuilding. JAD is president of the Clinton Club. SCA is manager of TEN, succeeding AUL, who has resigned. WML was elected president of the Newton Club. YSQ is secretary. JDV is rebuilding. YSQ has new jr. operator. The Cedar Valley Radio Club recently was presented its charter of affiliation with ARRL by DEA, our Director. A good demonstration of s.s.s.c. can be had almost any night on 3999 kc. from CJD and MNN. CJD uses a 6AQ5 running 15 watts and has worked all but the 6th and 8th districts. GFQ worked UA3AM. QUF is now Dr. Ralph Smith. QZP's beam came out second best in a bout with the wind. AWF now has a new rig doubling his power. The North Iowa gang's 28-Mc. groundwave net is working FB. QDB has new e.c.o. using Clapp oscillator. TLCN now has 36 active members. The Waterloo Emergency Net meets at 0800 Sundays on 3810 kc. QAO is a member of TLCN, TEN, and CAN. WMU reports TLCN calling its Sunday drill at 9:00 A.M. instead of 11:00 A.M., as before. SCW says his activity is limited. It's time for our Iowa clubs to give consideration to our Director's desire and plans for a state federation of radio clubs. SQQ maintains a schedule with VE2SC. USD had a fine article in his trade paper about his ham hobby. Traffic: WØHMM 683, QVA 161, SCA 112, NYX 111, QAO 101,

(*Continued on page 78*)

{ Number one hundred ninety-two of a series }

IN RADIO the unconventional may be the cause of luring one from the well-beaten path of daily habitat. Thus, it was that the hope of listening to a S.S.S.C. signal found us the other evening tuning across the 75-meter 'phone band far from our usual stamping grounds on the VHF bands.

It was interesting to see how the other end of the ham world lives. A couple of S.S.S.C signals were found and tuned in by following the unique technique of receiver tuning and adjustment recommended for use in their reception. The AVC was turned off, R.F. gain retarded, A.F. gain advanced and the tuning dial turned very, very carefully. Pastafazool! It works!

After there were no more S.S.S.C. signals to conquer, we continued tuning around with the receiver in conventional manner. Of course, the band was crowded. Two meters was never like this! The crystal filter was quickly put into action to obtain sharper selectivity; this seemed to leave something to be desired, though, as the readability suffered as side-bands were cut. Plenty of "lows," but the "highs" that contribute most to readability were down. Somehow, this didn't seem to be the right way to tune in these signals. We were keeping the carrier intact and clipping our sidebands. Now, the chief purpose of the carrier is to move the S meter while the intelligence comes from the loud-speaker. Of course, to many hams the S meter is the more important of the two anyway. Did you ever stop to think that, even at 100% modulation, we are transmitting twice as much power to swing the S meter as we are to actuate the loudspeaker?

What to do about it? The most favorable spot on the selectivity curve is the nose which is the point of least attenuation of the desired signal. Let's get the carrier off of it and put one of the sidebands there. The other sideband disappears, but so what? You don't need a mirror to see what the other fellow looks like. So we detune the receiver so that the carrier is, say, 1000 cycles off the nose. It doesn't sound good! The reason is simple: We have reduced the strength of the carrier, while those components of the side-band on the nose of the selectivity curve are now un-attenuated so we now have the equivalent of a very badly over-modulated signal. What to do now? Let's get rid of the carrier and substitute a new carrier of ample strength in its place. The carrier is easily eliminated by adjusting the phasing control to a setting that phases the carrier out. At least 80 db. of attenuation should be possible in a properly designed crystal filter. Egad! What is happening to the S meter? As the proper setting of the phasing control is approached, the S-meter reading will go to zero if the carrier is unmodulated. But if the carrier is modulated, (as practically all 75-meter 'phone carriers are!) the S meter will dance wildly up and down as it is now actuated only by side bands which are far from steady with most voices. If you can stand such desecration of ham convention and can steel yourself to the fact that from now on we are going to ignore the S meter, we are ready to proceed further. Since the S meter is now useless and there is no carrier to develop AVC, let's turn off the AVC, retard the R.F. gain control and advance the audio gain control. Notice that this preceding sentence is the technique advocated for reception of S.S.S.C. signals. Now we need to turn on the BFO to generate the carrier that is needed to replace the transmitted carrier that was previously phased out so that demodulation can be accomplished. More S.S.S.C. technique! The BFO knob must now be adjusted so that its frequency is identical to that of the extinguished carrier (and we really mean identical — to within 10 or 20 cycles). This can be accomplished by ear by turning the BFO knob very slowly until the noise emanating from the loudspeaker sounds human. Now we have the final result. All this while the tuning knob has remained untouched. We can now tune the receiver to any signal in the band adjusting nothing but the R.F. gain control to compensate for a change in signal strength. This is similar to exalted-carrier operation and can be called S.S.E.C. Or is it S.S.S.C.? As you tune into a signal, a beat note will be heard between the carrier (not yet phased out) and the BFO. Simply tune this down to zero beat at which point the carrier lands on the phasing notch and disappears and the BFO knob should be carefully adjusted for best quality. S.S.S.C. signals can be tuned in similarly except that no heterodyne will be heard as the carrier has already been suppressed at the transmitter. Perhaps you just can't get the S.S.S.C. to make sense at all. This means that the wrong side band has been suppressed and it will be necessary to reset the phasing notch and BFO on the opposite side of the selectivity curve to receive it.

The system described above seems to be far more effective than the usual "on the nose" system of tuning but it requires very careful tuning. Give it a try but don't give up too soon. It will take time to get used to the technique and it will require considerable will power to tear yourself away from old habits.

A couple of hints may help to make the initial adjustment easier. To help set the BFO to the carrier frequency, detune the phasing control slightly to let through a little carrier. The BFO knob can now be adjusted to zero beat. Now the phasing knob can be reset by off-setting the BFO knob to get the same heterodyne with the carrier. The phasing knob can now be adjusted for minimum heterodyne strength after which the BFO knob may be returned to the "zero beat" position.

The above operation will give the equivalent of single sideband exalted-carrier reception with only the necessity of acquiring the proper operating technique. It is not necessary to pay out a couple hundred bucks for additional equipment; everything necessary was provided when you bought the receiver.

How to eliminate a heterodyne now that the phasing control has to be used for carrier suppression? A Select-O-Ject will do this for you, of course. CAL HADLOCK, W1CTW

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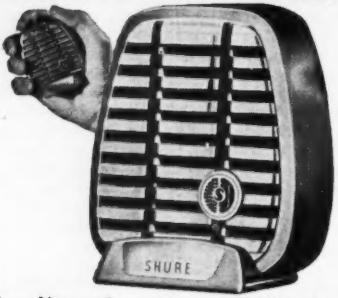

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MODEL	CABLE	OUTPUT LEVEL	IMPEDANCE	SHPG. WEIGHT	CODE	LIST PRICE
710C	7 ft.	52.5 db below 1 volt per microbar	High	1½ lb.	RUTUF	$12.95
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MODEL	CABLE	OUTPUT LEVEL	IMPEDANCE	SHPG. WEIGHT	CODE	LIST PRICE
710A	7 ft.	50 db below 1 volt per microbar	High	1¼ lb.	RUDEL	$10.00
710S (with switch)	7 ft.	50 db below 1 volt per microbar	High	1½ lb.	RUDET	$12.00

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NXW 61, FUB 47, YDN 32, NWF 27, WMU 20, SRR 12, SCW 4.

KANSAS — SCM, Earl N. Johnston, WØICV — Members of the Kaw Valley Radio Club at Topeka held a simulated emergency drill recently under the direction of UPU, EC for Zone 3. 3.5- and 7-Mc. c.w. were used, as well as mobiles on 29.5 Mc. and 3920 kc. AHW, of Lawrence, says the Naval Reserve has installed a station on K.U. campus and is awaiting call. AHW's shack has been moved from the 2nd to 3rd floor of Electrical Enginnering Lab Bldg. MID has new Class A ticket. 3NTN now is ØAEU with Class A, and GOV is the proud owner of 1st-class telephone ticket. AMP has installed 28-Mc. mobile in the car. FER, of Hayes, has built a new keying gadget to help out in his many traffic schedules. He and OOT have been taking Kansas traffic from Regional Net TEN and would like help on the second trick. FDY, our new OO from Garden City, sends in his first report but has no Kansas boys on the pink list. KXL's traffic total dropped this month because of the illness of his father. AAZ, of Topeka, is getting on 144 Mc. He has receiver going and will soon have a 522 on. UPU has new NC-183 receiver. SSB, of Topeka, is a newcomer on 3.85-Mc. 'phone and is reporting into Kansas 75 'Phone Net. SO, of Silver Lake, having conquered the world on 3.5- and 7-Mc. c.w. with his 460-foot skywire, is contemplating 3.85-Mc. 'phone. FLZ had hard luck with his final plate transformer shorting out. Traffic: WØOOT 250, FER 110, FDJ 54, NIY 31, KXL 29, TVU 28, YOS 27, UKH 17, BNU 5, ICV 5, AHW 4, LIX 4.

MISSOURI — SCM, Ben H. Wendt, WØICD — PTG had been keeping alert watches expecting flood conditions when suddenly an ice storm hit. With the assistance of RAO, CZI and K5NLR traffic went through. OMG received a message from the Red Cross in Kansas City through VRF. Doc phoned Kansas City to verify the message then delivered it to the local radio station, which in turn alerted the populace of Poplar Bluff on an approaching storm. The Missouri Emergency Net, the Missouri Net, and individual operators were alerted several times recently standing by for emergency traffic. The new South East Missouri Net is operating on 160 meters at 1900 CST Mon., Wed., and Fri. DEA is visiting clubs throughout the division presenting the Club Federation plan. The SMARC elected FUM, pres.; BVG, vice-pres.; ICW, act. mgr.; CGS, secy.; and GBJ, treas. OMG, LSA, and GNX are installing high- and low-pass filters in their battle against TVI. ØINK/5 was frantically being searched for by friends because his home in Poplar Bluff was flooded with water caused by a break in the water line. Twenty-four fruitless hours of phoning did not contact INK so OMG, via amateur radio, contacted INK within an hour to send INK back home. The Poplar Bluff Amateur Radio Club was organized with GNX, pres.; ZAO, vice-pres.; MTB, secy.-treas. PMI and YYI are experimenting with a circuit by CEX using superimposed modulation with a pair of 813s. AIP and AIQ are new hams in Marionville. Among those constructing and revamping gear, we find WRQ dressing up the rig, OUD working on an automatic keyer, WAP working on 75-meter rig, AXL completing a kw. job, LSA completing a kw. power supply, YIH going on 28-Mc. mobile, and PME completing automatic keyer. Traffic: WØPME 330, QXO 208, KIK 88, CGZ 77, WAP 66, OUD 35, SOM 17, PMI 14, QMF 9, PTG 8, NNH 7, ICD 4, ARH 1.

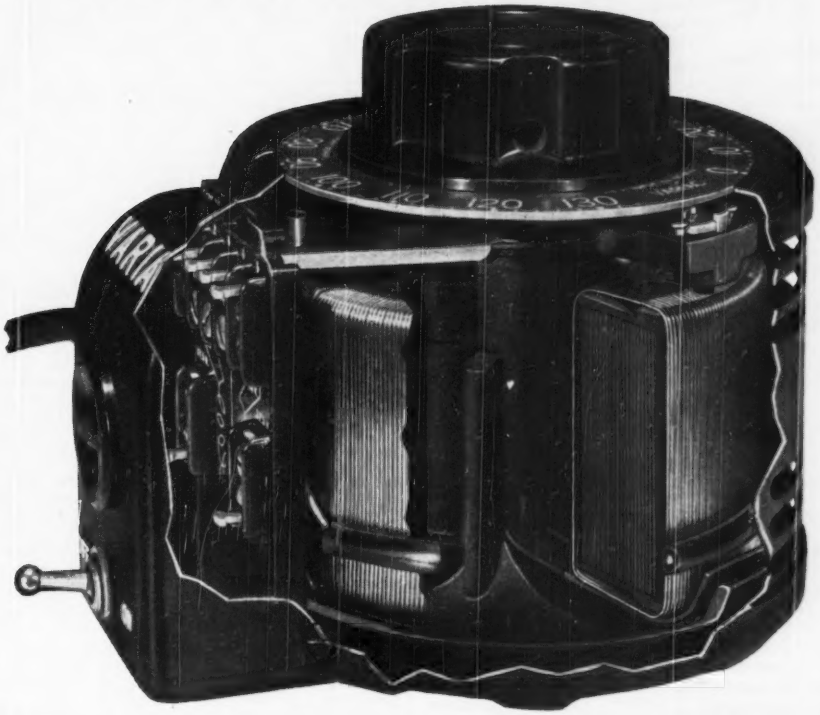
NEBRASKA — SCM, Scott E. Davison, WØOED — LPU, GJM, AZC, RCH, QOU, AYO, and BPY are looking for 144-Mc. contacts. The Ak-Sar-Ben Radio Club made your SCM an honorary member. EUT is new PAM. KJP is new NCS for the 'phone net. KON reports for North Platte. PAY has new HT-9 on 28 Mc. OHK is back on with portable. OHU visited Nebraska hams recently. SAI puts out a potent signal when not on CAA duty. ERM, portable, worked 1MK for ten miles. RQK has new 304TL final. BRW has new converter for SS. ZOG is on with p.p. 807 final. ODB has new 28-Mc. beam. COU was host to the N-P Club recently. VQR has new final. IXL says code class is going great. The Hastings gang, PLF, NPZ, BVR, RXU, and YZI, with LJO gear, put on a ship-to-ground show from four-place plane to try emergency gear. The Falls City Radio Club was organized recently with VTQ, pres.; ZJF, vice-pres.; BQR, secy. Licensed members operate on 10 and 160 meters with their own High Jinx Net. HZE is building a rig using super-modulation. AFZ is a new call in Omaha on 28 Mc. PZJ is on with a modified version of grid modulation. DHO worked AMY operating SSB. DHO and AZH have new TBS50s. NWC is on 160. FHJ operates portable on 28 Mc. HVX is on 28 Mc. IDR is 100 per cent emergency-equipped. MJY, YWK, KBR, YLC, and DNV are on 160. FHA has 1st-class radiotelephone license. Traffic: WØFQB 305, KJP 182, GMZ 125, FAM 109, CBH 50, JDJ 40, DMY 32, SAI 27, FMW 23, IXL 23, LJO 12, THF 11, NVE 10, IDR 9.

NEW ENGLAND DIVISION

CONNECTICUT — SCM, Walter L. Glover, W1VB — While the proposed contest in the CD Contest between the Connecticut and Virginia sections did not materialize, the Connecticut gang was in there pitching and some good

(*Continued on page 80*)

9 REASONS *why most people use* VARIACS



1. **EXCELLENT REGULATION** — less than ¾% at line voltage and less than 3% of line at ½ line voltage. There is very little change in output voltage under varying loads with the VARIAC*
2. **TOROIDIAL CONSTRUCTION** — voltage change is directly proportional to dial rotation over the complete output range
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7. **NO PIGTAIL CONNECTIONS**
8. **SAFE TERMINALS** — for either screw or solder connections — clearly marked in output voltages
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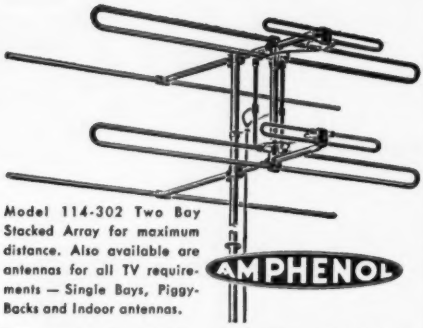

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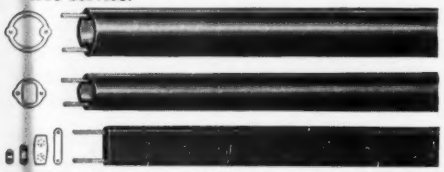

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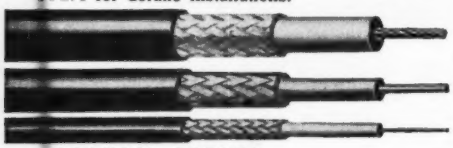

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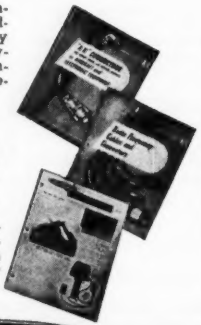
Amphenol Coaxial "RG" cables are produced to standards that surpass Army-Navy specifications. Charts showing characteristics and dimensions are available upon request.



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scores should show up. The CN Net is going strong at present with probably the largest attendance ever and with good coverage of the section. CTN also is progressing favorably. VW reports CPN is doing swell with NBP, EMF, KDK, LWW, and FOB acting as NCS Mon. to Fri. and KDK, MBK, VW, and RCV on Sundays. GC is back on the air again and is de-bugging the rig in order to be more active. LKF attended the hamfest of the New London gang to give a talk on emergency matters. RWS and ICP were guest speakers at the January meeting of CARA in Danbury. OS has finished his new house in Easton, and is planning a new rhombic when he gets back on the air. New officers of the Stratford Club are HYF, pres.; ASO, vice-pres.; RFJ, secy.; and Mats Forslund, treas. AH says he is going to take a crack at the next FMT, his first try. ODW, a new ORS, reports he uses a 553-ft. long wire which works FB. It is with regret that we learned of the death of EEI and JHM. Sorry, too, to hear that QAK is going to the hospital. APA now has a kilowatt to a pair of 810s, which makes a difference in DX. NYC reports little activity on 28 Mc. these evenings in his vicinity because of TVI. KQY is sticking to the 7- and 14-Mc. bands these days. RNT and QVF were hitched on Dec. 31st. Congrats. Traffic: W1NJM 470, BDI 162, AW 160, HYF 158, DAV 153, KUO 140, BVB 93, KV 87, QIS 83, LKF 70, CTI 60, BIH 47, ADW 42, JTD 37, NBP 30 VW 26, LV 20, CJD 19, FOB 16, APA 11, QVF 11, SJ 11, LIG 6, RWS 5, ODW 4, QAK 4.

MAINE — SCM, Manley W. Haskell, W1VV — Pine Tree Net: RM NXX, 3550 kc., 1900, Mon. through Fri. Sea Gull Net: PAM FBJ, 3961 kc., 1700, Mon. through Fri. New OPS is GJY. GJY pushes 250 watts on 'phone and goes to town with a 522 on 144 Mc. RJQ has his modulator ready and will try it out on 28 Mc., graduating to 3.85 Mc. when he gets that "A" ticket. IGW has succeeded QUA as SEC for Maine. QUA has done a fine job of organizing the AEC throughout the State and his efforts will bear fruit for a long time. IGW did an outstanding job in the recent EC simulated test, particularly in regard to effective use of mobile units. DZU became a Silent Key in January. "Hunk" Beardsley was regarded as the Grand Old Man of wireless and radio in the State of Maine. His counsel and advice will be sorely missed. The PAWA elected the following officers: QUI, pres.; ITU, vice-pres.; RSX, secy.; JRS, treas.; LNI, chief op. Permanent committee: QUA, CRP, SEY, JVU. Business meetings will be followed by minor activities the next meeting and then major activities. Fluorescent lights and improved ventilation are planned for the club-house. The matter of a hamfest is under consideration. Traffic: W1NGV 272, YA 134, LKP 106, KLH 105, NXX 86, EFR 61, VV 56, FBJ 31, LBJ 29, ROM 25, KEZ 24, QUA 19, IGW 13, PTL 13, AFT 9, GMD 9, JAS 8, AMR 6, FV 6, KDE 6, COV 5, QDO 5, AWN 3, GE 3, RJQ 2.

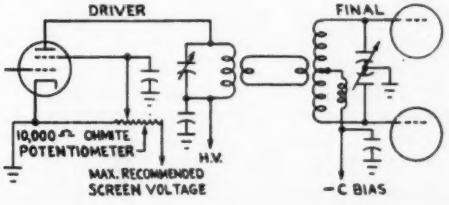
EASTERN MASSACHUSETTS — SCM, Frank L. Baker, jr., W1ALP — New appointments: LQQ as EC for Hamilton, IH as OBS and ORS. The following have had appointments endorsed: As EC-KTG, ALP, UE, HIL, MF, MON, OBL, PLQ. As OPS-HIL, HXK, AR, AAL. As ORS-HXK, JDP, TY, AGX, WI, HA, PU, AAL. As OES-HIL, CTW. As OO-LQQ. As OBS-HXK. RBK is being transferred back to Washington, D. C., and will be on as 3HH. AKN, SGW, AYV, and CGM, members of the Brass Hat Net, gave him a party and presented him with a new bug. We are sorry to have to announce the death of HXM. DPV now is in Winchester. WB, MON, HRA, and AHB are on 144 Mc. QIU is on 220 Mc. The South Shore Amateur Radio Club committee wants to thank all who showed up at the hearing at the State House in Boston to get number plates with their calls on them for their cars. QOI, as chairman, and his XYL and MCR, OTZ, OKK, CC, SVF, QMD, ALP, RTW, CTR, SOE, and BUG spent a lot of time on it. HWE gets on 28 Mc. JJY helped SPE get his ticket. JJY is working hard on National Guard Net. RXT got his commercial telegraph license. AAL is working on remote control for his rig. MDU is working on a small rig for 3.5 Mc. The Southeastern Radio Club of New Bedford bought a BC-610. The Brockton Amateur Radio Club reëlected NZP, pres.; FRZ, vice-pres.; OEG, secy.; OBL, treas. The South Shore and Eastern Massachusetts Clubs held a joint meeting in Cambridge. QCS won the door prize, a Workshop 10-meter beam. QMJ reports the following active in the Eastern Mass. Net in January: AHP, BMW, EMG, EPE, FGT, JCK, JJY, LM, MX, NBS, PYM, QKM, QGG, RBZ, RRH, RXT, QZS, TY, UE, ZR, RNI, and AMI. HIL has a 30-watt job on 7 Mc. 4PZZ, ex-1IID, Miami Beach, Fla., wants the gang on 50–144-Mc. to look for him. HSV gave a talk on "Audio Systems for Ham Transmitters" at the Quannapowitt Radio Assn. meeting. MEG has a three-element beam for 28 Mc. The Eastern Mass. Club had a discussion on TVI. The South Shore Amateur Radio Club recently celebrated its 19th anniversary. The following charter members attended: AKN, AKY, ASI, VX, and ex-1UG. Martha's Vineyard Radio Club has voted to affiliate with ARRL. The Merrimack Valley Amateur Radio Club elected CBY, pres.; Norman Given, secy.; Dick Beaulieau, treas.; QWR, act. mgr. Board members are CBY, NNG, MQN, QWR, RLF, NZX, and N. Given. Meetings are

(*Continued on page 82*)

How To Protect Your Tubes while tuning to resonance

For a number of years, hams have been using various methods to tune the final of their rigs to resonance. Some of these methods have proved disastrous when the resonant point could not be found before the plate structure of the final tubes developed large holes. Using an Ohmite wire-wound potentiometer to vary the output of a tetrode or pentode driver stage by varying the applied screen voltage has proved to be the most effective and economical means of tuning the final with complete safety for the tubes. The circuit is shown below. (*Must use fixed bias.*)

This circuit has three obvious advantages: (1) The drive to the final amplifier may be reduced to the point where the plate dissipation is not excessive when full plate voltage is applied. The final tank may then be tuned without danger to the tubes; (2) The grid drive in the final amplifier can be adjusted easily for any band of operation; (3) By reducing the screen voltage to the point where the plate current of the driver is within safe limits, the driver tank circuit can be tuned without causing excessive plate dissipation.



For the smaller screen grid tubes of the 807 type, a 10,000-ohm, 50-watt potentiometer is recommended (Ohmite Stock No. 0332). The larger screen grid tubes of the 813 size require a larger potentiometer, and the 10,000-ohm, 100-watt (Ohmite Stock No. 0463) is recommended.

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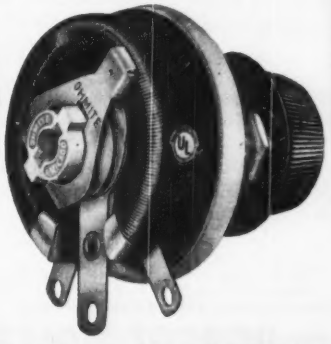

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  (2) 25 c.p.s. for line voltage variation of plus or minus 10%.
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held the 2nd and 4th Wed. nights at the former site of WLAW, West Andover. The call is NBN. The Club has an HT-9 and NC-101X receiver and is on all bands. Visitors are welcome. PLQ got his Class A license. OLC is going portable. QPR finally got his beam up in the air. MON has a six-element stacked array on 144 Mc. WI recently QSOed 6ZZ, ex-1WV, who sends his 73. OBL has a portable c.w. rig. IH has a Collins 32V-2. GGV is working hard in the T-9 Radio Club's 80 Meter Contest. Traffic: (Jan.) W1EMG 242, PYM 123, RXT 108, LM 106, KKJ 54, TY 53, ZR 43, DMS 33, QJB 28, JCK 25, PU 23, JJY 16, WU 15, AAL 14, RBK 11, HWE 3. (Dec.) W1JJY 94, MDU 12, ILN 2.

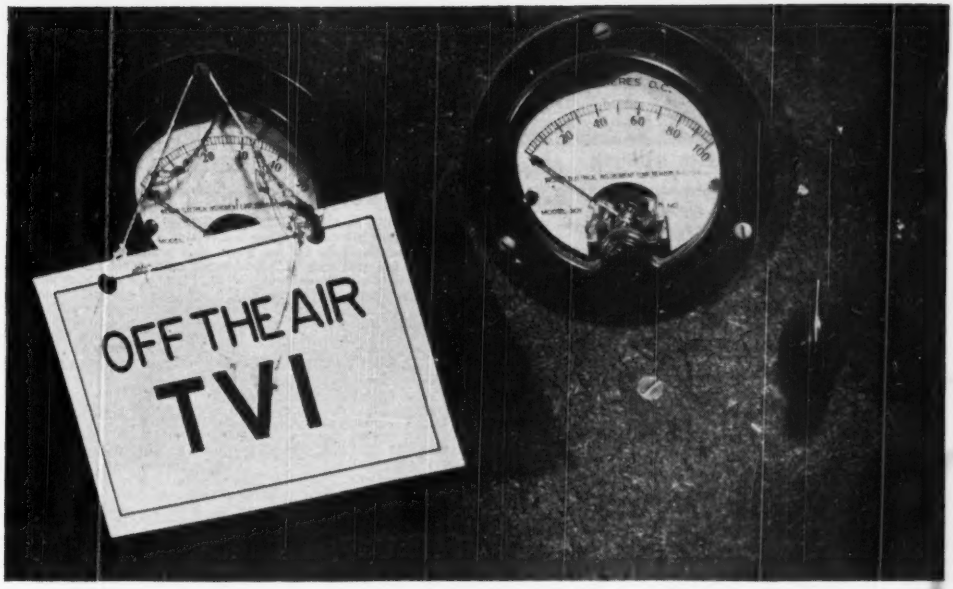
WESTERN MASSACHUSETTS — SCM, Prentiss M. Bailey, W1AZW — RM: BVR; Net frequency: 3725 kc. Monday through Friday 7 and 10 P.M. Net call: WMN. EGN, ETY, and SFU are new members of HCRC. IJT participated in 10-meter WAS Party. QWJ walked away with HCRC high score in V.H.F. SS. RFU was a close second. EOB now is assistant manager of EAN. Vic got 443 in 58 in the CD Party. JYH had to quit at 350 in 48 because of company. RDR has 81 countries on 28-Mc. 'phone. DXW and RDR now have Class A tickets. RRW has been favoring a trick knee after a trip to the hospital and surgery. EFC, the EC for Southbridge and vicinity, reports AEC activity on 29,300 kc. with HFO as a long haul tie-in. MOK, EC for Holyoke, has organized AEC drills on 7110 and 29,080 kc. NY controls the Western Massachusetts 'Phone Net on 29,250 kc. each Thursday at 9 P.M. NY also controls the New England 'Phone Net Sunday mornings at 9 A.M. on 2865 kc. All New England participation is invited. NLE, EC for Springfield, recently was the subject of publicity with OJV and UD for the Red Cross. BVR finally ran into TVI and is now one of the LPF boys. COI held out for a long time but this month he walked down the aisle a married man. RZG is chasing DX on 7 Mc. when not replacing filter condensers. IHI and AZW handled information on skiing conditions to W2 gang. EFQ, MUN, and BKG made the February FMT measurements. BDV's new shack in the basement is a ham's dream. Jim renewed ORS and OPS appointments. GZ renewed ORS appointment. GVJ renewed OPS appointment. QCA is recuperating from a heart attack. LUD and PYR were active timing important ski races with radio. LKO has mastered his four-element beam. AMI is using tube keyer and new VFO. Traffic: W1EOB 488, BVR 135, AZW 48, RZG 22, AMI 20, BDV 16, MOK 8, GVJ 5.

NEW HAMPSHIRE — Acting SCM, Clifton R. Wilkinson, W1CRW — RM: W1CRW. Certificate Nr. 7 for WNH goes to 1BBN of Rhode Island. In February BFT marked his twenty-fifth year as an active amateur. New officers of Concord Brasspounders are IJB, pres.; AOQ, vice-pres.; QYZ, secy.-treas. OMZ, MKD, FLU, SBX, and RYD are often found on 28-Mc. 'phone. QCY now is ØFYD. HQE has new QTH. SKI is using new rig. HTO is DX hunting again. The Nashua Mike and Key Club recently held its 12th annual banquet. QJH now is TV servicing. SBX received confirmation of contact with Russia. ET, the club station of the Dartmouth Radio Assn., is back in business operating 3.85-, 14-, 27-, and 28-Mc. 'phone with 150 watts and 7- and 14-Mc. c.w. with about fifty watts. Two 110-foot towers atop the physics building support colinear arrays on 7 and 14 Mc. and a three-element rotary beam on 27 and 28 Mc. PVF has 38 countries confirmed out of 50 worked. EWF is sporting new Collins 75A-1 receiver. He lost 80- and 20-meter folded dipoles in high winds. CRW enjoyed lots of contacts in the CD Party. Traffic: W1CRW 519, QYZ 92, MXP 36, PFU 32, QJX 29, SAL 24, RFP 6, EWF 3.

RHODE ISLAND — SCM, Roy B. Fuller, W1CJH — RM: BTV. PAM: BFB. The personnel of the Rhode Island Net gathered at the QTH of yours truly to further coördinate activities of the traffic set-up. Those present were BFB, BTV, BBN, HLY, LWA, ODJ, RVO, and CJH. The PRA held its annual elections Jan. 20th. New officers are NZR, pres.; QLD, vice-pres.; RAY, secy.; KKE, treas. The Newport County Radio Club elected the following: RTR, pres.; BLS, vice-pres.; JFF, secy.-treas. SEC MIJ reports activities are well planned and under control. He now has active ECs in the most important parts of the State. MIJ and OHR mobile units covered the recent fire on Allens Ave., relaying and describing it to some of the boys on 28 Mc. Join the Emergency Corps; contact MIJ. The Cranston Radio Club reports its 147.5 Mc. emergency net is active Mondays at 2100. CPV, QLD, and HLY are reporting to RIN now. HLY is off the swing shift. BTV is chasing WAS on 3.5 Mc. week ends. MCP is on 3.5 Mc. SKC is on 28 Mc. with a converted 522. Look for HRC on single-sideband soon. The NAARO's club station, SKT, has a new transmitter and receiver and is active mostly on 28 Mc. Traffic: W1BBN 142, QR 134, BTV 100, CJH 94, ODJ 16.

VERMONT — SCM, Burtis W. Dean, W1NLO — MMV has DXCC and WAS certificates on 29-Mc. 'phone. QNM has WAC and WAS certificates for 29-Mc. 'phone. OKH finally worked his 100th country on 29-Mc. 'phone. LVP has 2E26 on 29-Mc. 'phone. NWW is on all bands with his new 400-watt final. SAT is on 160-meter 'phone. BJP has HFS and is getting fired up for 50 Mc. OKH and AXN were the winners of the recent BARC Contest. CUN is on 14 and 3.5 Mc. from Newport week ends. BLC has Meissner Signal

(*Continued on page 84*)



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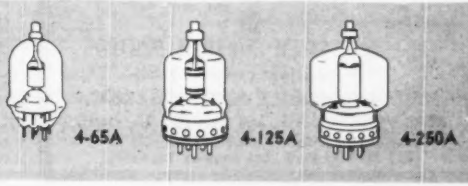

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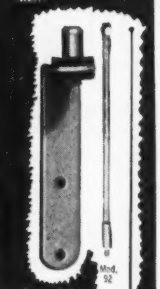

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Shifter. AXN has four-element 10-meter beam over two-element 20-meter beam. BRO has moved into the house and has 10-meter beam 48 ft. in the air. BLC and CUN are building secret antenna for 144 Mc. Several outings are being planned for the summer months for the Vermont ham, XYL, and family. The BARC is working on plans for the annual Vermont Hamfest to be held in Burlington in October. NLO has NC-173 and TBS-50D. Traffic: W1KRV 148, RNZ 57, KJR 45, OAK 39, JEN 31, PZX 18, RNA 16, IT 15, ELJ 6, AXN 5.

NORTHWESTERN DIVISION

IDAHO — SCM, Alan K. Ross, W7IWU — Sorry I missed a report last month, gang. I put it off a bit too long, then landed in hospital for ten days. Had a shorted condenser across the grid leak. (Medical terms on request.) Moscow: MVA now is in Washington, D. C., with the call 3QCW and is on all bands. 7MRL and 2MRL/7 both have rigs on the campus. Hayden Lake: FIS bought a jeep to insure getting to work through snow storms. Firth: NBD has applied for AEC membership. Twin Falls: NH is ORS again. KEK spent some time in the hospital. Oakesdale, Wash.: KDV moved here from Kendrick. Other moves are HAH to Burley, and LQU to Cornish, Utah. Boise: The EC is JHX. Please report your activity in the January QSO Party. I worked 9 different stations in 3 cities. Let's have any ideas for the next one. Traffic: (Jan.) W7EMT 124, BDL 23, GHT 17, IWU 11, BAA 9. (Dec.) W7EMT 176, DMZ 124, IWU 73, GHT 70, GTN 51, BDL 32, NH 21, WJT 17, BAA 16, IY 6.

MONTANA — SCM, Fred B. Tintinger, W7EGN — KUX and KJX helped LOD get back on the air from the Deaconess Hospital at Bozeman. IXL is back from W6-Land and claims possibilities of 144-Mc. mountain-hopping over most of the State. KJX is building 160-meter rig. KUX is experimenting with screen modulation of 813s. KOR is on 28-Mc. f.m. and is Bozeman outlet for 3520-kc. c.w. net. BXL has shown up on Montana 'phone net with his new 750-watt rig. IEH has new Collins 32V-2 and is making use of new Class A on 3.85 Mc. and Montana 'phone net. GBL made WAS on 14 Mc. NWC is new ORS in Kalispell. FEE is using crystal double conversion to BC-454 then into a 3C-453 Q5-er and then into a Select-O-Ject. AFM has new Collins PTO basic unit. BGG has moved to Oregon but schedules Montana c.w. net. LIT and KUH are new Billings ORS. More use is being made of net frequencies for ragchewing during non-schedule periods. This should be encouraged so that we will know where to look for local Montana ragchews and emergency outlets. Net frequencies are: MFN, 3995 kc.; MSN, 3520 kc.; and CAP, 3620 kc. Traffic: (Jan.) W7CT 140, EGN 59, COH 36, BNU 23, LIT 21, LEQ 20, FEE 3. (Dec.) W7LIT 217.

OREGON — SCM, J. E. Roden, W7MQ — Astoria: New Club officers are HLJ, pres.; HJU, vice-pres.; HCY, treas. Albany: SO wants more check-ins on 3600 kc., and NCs. Baker: HAZ reports that the Club now has the call NYW. Bend: HHH reports KL7IS and his XYL, KL7RN, from Shungnak, Alaska, visited the GNJ-HHH shack recently. Coos Bay: The Club assisted local law enforcement officers in a man-hunt by using their 28-Mc. mobiles. Elgin: IGI is a new AEC member and will tie in with Pendleton and LaGrande areas. Eugene: NHA and FPY are new 28-Mc. mobiles. Klamath Falls: QP has new 10-20-meter rotary beam. Medford: New officers of Rogue Valley Radio Club are FMQ, pres.; LYY, vice-pres.; LNG, secy.; A.O. Cutchin, treas.; IRZ, tech. advisor. Pendleton: ADX, KTF, and BUS are active on 160-meter net. Portland: HCQ is OARA Convention secretary. KZI and GXO had an unusual 'phone patch set-up breaking the news to the world on the finding of the Eberle girl. GXO is new OPS. AJN is proving a fine jump station from 29.2-Mc. mobile net to clear traffic to OSN on 3585 kc. Philomath: APF is doing a wonderful job as Net Control on OEN, 3865 kc. Tilamook: New Club officers are IDP, pres.; BUH, vice-pres.; FKA, secy. Traffic: W7ESJ 314, APF 308, GWE 262, HDN 169, AJN 132, IIV 114, GNJ 110, DIS 100, MQ 99, HLF 81, AIZ 77, EJF 68, AXJ 63, FY 54, JLU 48, GXO 47, JRU 47, GZW 44, MYI 44, HVX 41, NOB 37, FKA 33, FRT 33, MNS 29, BDN 27, KL 26, EBQ 25, AUH 22, LT 20, JGH 16, GEU 14, NQD 13, JOP 11, KIN 11, HAZ 10, JVO 8, NGG 7, BSY 6, EHW 6, ADX 5, AZK 5, FPK 5.

WASHINGTON — SCM, Clifford Cavanaugh, W7ACF — SEC: KAA. RM: CZY. PAM: CKT. DXZ and IJJ renewed their OO appointments. ETO says that 20-to-24-degree-below-zero weather is not so hot for a mailman. ZU is taking it easy this month; too much office work, he says. FRU had trouble with his bug freezing up during the cold spell. AXT is busy building TV receiver. KAA, the SEC, sends in a fine report on section AEC activities. FPP, editor of *HI-MU Journal* of Walla Walla Radio Club, turns up with new simplified break-in system — he has four switches to throw and two wires to connect between each transmission. JJK is busy between WARTS, WSN, and RN7 Nets and reports a new ham in Sumner, 7NZM. KTL is completely snowed in. NKO, EC of Walla Walla, was in close contact with Blue Mountain search and rescue party. CWN

(*Continued on page 86*)

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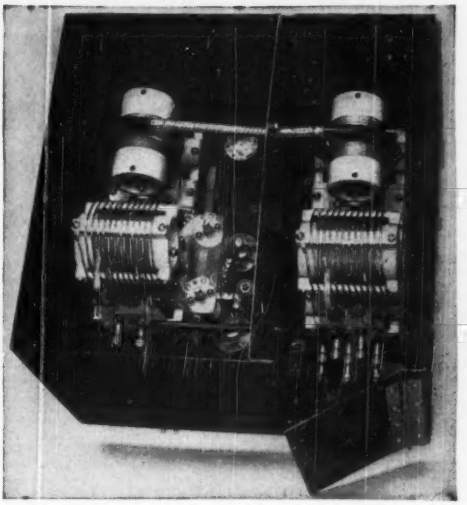

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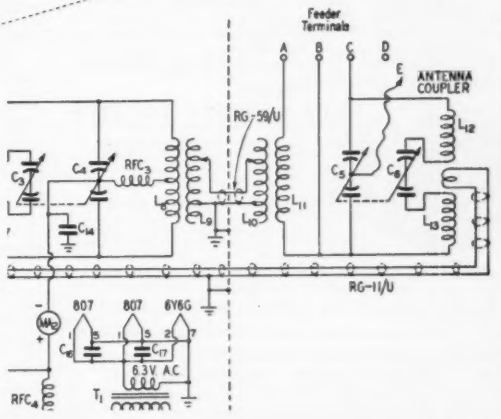
1. How can I find the value of this JAN fixed condenser? The colored dots don't mean a thing to me. (p. 511)
2. M-derived filters — that's all I hear about. Where can I get the dope? (p. 542)
3. Wonder if I can put in this 40A brown bead pilot light? The burned out light is a 47. (p. 540)
4. θ again! What's the name of the animal and what does it mean, anyway? (p. 540, 549)
5. QSD. Wish I could find this in a hurry. Maybe he meant QSB. (p. 549)



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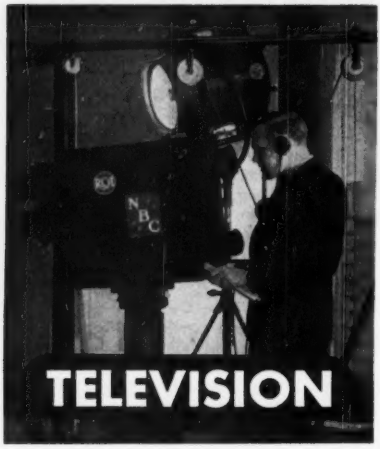

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has finished his new 811 amplifier and is thinking of telescope grinding. CZY works more schedules than NPG. DGN got into his first CD Party and says it's lots of fun. HWK is back on the air after an illness and is handling lots of traffic. FWD says he has given his station a new look — he hung up one of EHQ's calendars. FWR's QSL Bureau is doing a land-office business. FIX reports that the Alaska net checks in on WSNet nightly at 2200 and that they meet on WSN frequency at 2300 PST nightly. KCU handles her traffic and rag-chews in Spanish and German now. JZR cut a hole in the living-room ceiling to heat his shack during the cold spell and now his YF won't allow him on the place. EAU worked 40 sections and 106 stations in the CD Party. MBY, one of our very few OES appointees, sends in report on high-frequency work. EPW reports that a brand-new YL operator arrived on Jan. 22nd. NUN says the Seattle gang is unable to hear SSQ's official bulletins on 28 Mc. JC made a big score in the CD Party. BG, an old spark man, is on 28-Mc. 'phone. IOQ is doing a fine job with 'phone patches for overseas traffic. EYN received 25-w.p.m. CP certificate. SJ is busy with the Navy gang but does get on 7 Mc. at times. LJM is having TVI troubles and is rebuilding his complete station. Traffic: (Jan.) W7CZY 1937, FIX 328, KCU 205, JJK 197, HWK 172, JZR 127, ZU 97, FWD 90, FRU 58, ACF 56, KAA 54, ETO 52, EPW 27, BX 26, LVB 16, AXT 15, EAU 15, APS 10, FWR 10, HGC 8, KTL 8, LJM 6, DGN 3, EYN 3, BG 2, NKO 2, CWN 1. (Dec.) W7EYN 22.

PACIFIC DIVISION

HAWAII — SCM, Dr. Robert Katsuki, KH6HJ — RU reports a new 12-wave Sterba on 28 Mc. beamed NE-SW. BW (RM) reports a new 7-Mc. net with AAJ acting as Net Manager. The 28-Mc. mobile club members are on every Tuesday at 1900 HST on 29.2 Mc. Remember, five confirmed contacts with mobile club members rates a certificate. UL has been our sole mainland outlet for the HPN. PY (OO) reports activities severely curtailed since the arrival of a fifth harmonic. SZ is off to the U. of Illinois. He has an 813 job with him. WU pushes a pair of 807s on 28 Mc. from home QTH but has a 2E26 on mobile. WU, PP, and NS maintain regular QSOs on 50 Mc. OV also appears on 50 Mc. WR and FD are teletype enthusiasts. BM reports QSO with PK3 on 28-Mc. mobile with about 50 watts. HJ continues to use suppressor grid modulation on 3.85- and 28-Mc. 'phone. Traffic: KH6UL 159, MN 27, BW 15, VE 13, AY 8, RU 7, PY 5, IN 4, PL 1.

NEVADA — SCM, N. Arthur Sowle, W7CX — Asst. SCM, Carroll Short, jr., 7BVZ. SEC: JU. ECs: HJ, JVW, KSR, TJY, KOA, KWZ, ZT. OBS: JLV, MZP. BVZ is the proud holder of a WAAC (Worked All Arizona Counties) certificate marked #1. 4KMC/7 now is 7OAJ in North Las Vegas. JU and BVZ have switched to n.f.m. and report no further BCI difficulties. JVW reports for his area. KGE, an XYL, is on 3.5-Mc. c.w. at Bristol. KUK is working on aircraft but gets on now and then. Both KUK and JVW are equipped with emergency 110- and 6-volt rigs. OAL, on Peavine Mt., near Reno, suggests that the California 144-Mc. boys point their beams at Donner Pass to work him for a Nevada contact. GC has returned from a trip to Mexico and is back DXing. Quite a few of the boys in the Reno area are on 160 meters. KOA is in Civil Air Patrol and is helping a neighboring CAP Squadron with its radio station. JLV has stacked 3 over 3 on 50 Mc. Send in your reports, gang.

SANTA CLARA VALLEY — SCM, Roy E. Pinkham, W6BPT — The following have been elected and installed as officers of the Palo Alto Amateur Radio Assn. for the 1950 season: LCN, pres.; TEP, vice-pres.; SYW, secy.; KFQ, BSQ, UCE, QXP, ECH, and FTG, directors. YWD, interference committee; FTG, net mgr. NW again makes BPL for the third consecutive month. TBK reports the 144-Mc. emergency net has a good attendance with over forty-five stations checking in on some nights. SCCARA is planning a big time at its annual barbecue to be held some time during the summer months. The Club has reserved the Local Brewery in San Jose for the grand old get-together. We'll announce the exact date later. NOE sure is putting out a fine signal with his screen grid modulated eight watts. Better check some of the magazines for details or better yet, contact Bill on 3.85-Mc. 'phone. WJM is heard briefly on 3.5-Mc. c.w. at times. PBV writes from Saudi Arabia that he holds the call MP4BAL on Bahrein Island. Bob says that he has worked only three stations from that QTH, running low power into an 807 and using TRF receiver. He operates on 14.099 Mc. and may be on twice that frequency. Of late he has not had much time to visit Bahrein Island. A few months ago Bob made a vacation trip to Italy and while there was married to a Dutch girl in Florence. I1IT and I1KN, with their XYLs, attended the wedding. Traffic: W6NW 308, BPT 161.

EAST BAY — SCM, Horace R. Greer, W6TI — Asst. SCM, Charles P. Henry, 6EJA. SEC: OBJ. RMs: FDR, ZM. ECs: AKB, EHS, NNS, IT, IDY, QDE, MLZ. Ray Meyers, MLZ, is the new Emergency Coördinator for the NBARA. JZ lost tower and beam in a recent wind storm. OT is sporting new Collins 310B-1. YDP has another traffic and operation class going at the ORC. DQL reports that he

(*Continued on page 88*)

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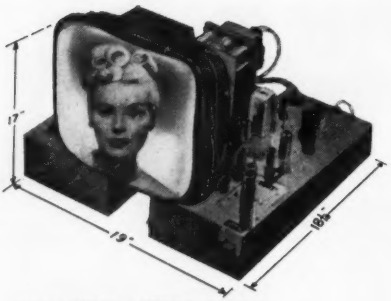

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has had a chance to use emergency power several times lately because of power failure. QXN has rebuilt his VFO. YDI is QRL Mission Trail Net. WII has been running traffic schedule with Okinawa daily. KV4AF/6 turns in a nice traffic report as new ORS. ITH has new TV set. VDR still needs Delaware for WAS. ZM is State Coördinator for the American Legion Net. The Northern California DX Club held a special get-together with the Southern California DX Club in Fresno on Jan. 28th. YQS's new QTH is 611 46th Ave., Napa, and is on the Mission Trail c.w. net. The Mission Trail Net had an FB birthday party over ham radio on Jan. 20th, according to BF. 2OUT writes that he would like anyone in our section interested in trunk line traffic on 3545 kc. at 2100 EST to drop him a line. IXH is QRL traffic. GIZ is with the Electric Supply Co. again. UZX and WII have found it necessary to drop OBS appointments. WUK and HDD are active in Vallejo. AYN got his old call back. WOF now has an antenna farm near Sonoma. DUU has a pair of 813s on 28 Mc. PAK has new VFO to drive a pair of 250THs. WAH is the happy owner of a new Shop Smith with all the attachments. WHA now is living in an apartment house. IKQ has new four-element beam. RRG was host to NIG recently. BGJ is active on 144 Mc. again. GMP is a new ham to this area. You should see BUC's antenna farm. RCC has new three-element 14-Mc. beam. DUB rebuilt new final and is on the air again. ZUI put in new power line. TI is cleaning up beam. SAI was a recent visitor to these parts. OBJ reports that the San Leandro Radio Club now has an FB house for its meetings and station which was supplied by the City of San Leandro. The new QTH is at the end of Davis St., San Leandro. QDE's beam now works FB, and he did the whole job by himself. EY still is having key click problems. Traffic: (Jan.) W6IXH 237, WII 225, FDR 163, OT 158, JZ 135, KV4AF/6 115, W6QXN 98, YDI 72, DQL 62, VDR 10, TI 3. (Dec.) W6BF 15.

SAN FRANCISCO — SCM, Samuel C. Van Liew, W6NL — Phone — JU 7-6457. PHF left Feb. 18th for Japan. We will all be looking forward to working you from that location. Best of luck. LVW is ill in the St. Joseph Hospital. We all hope for your speedy recovery, Fred. VCG is building a home down on the Peninsula and will be moving to that location soon. BYS has purchased a large relay rack to house his transmitter which is under construction. KNG is helping the Boy Scouts to organize an emergency communications set-up in Marin County. NL finished building new shack and will be back on the air soon. San Francisco has a new radio club called "Hams"-High Frequency-and-Mobile-Society. This is a consolidation of the Golden West High Frequency Club and the San Francisco Naval Shipyard Radio Club. Officers are WCD, pres.; BYS, vice-pres.; ZLQ, secy.; DZN, treas. The purpose of the Club is to promote interest in v.h.f. and mobile work as well as emergency work. Meetings are held the second Friday of each month at the Red Cross Building, 450 Gough Street, San Francisco. The majority of the members have purchased the B.N. radar gear and are converting it to 144-Mc. gear. They expect soon to have at least twenty-five mobile units. The regular meeting of the San Francisco Radio Club was held Jan. 27th. The guest speaker of the evening was Mr. Leigh Norton, CEN, of Eimac Corp. He gave a very fine talk on single-sideband operation. The meeting closed with the usual raffle and distribution of television raffle tickets. Refreshments followed. Traffic: (Jan.) W6VPC 59. (Nov.) KG6DI 3572.

SACRAMENTO VALLEY — SCM, Ronald G. Martin, W6ZF — Asst. SCMs: Northern Area, 6YNM; Central Area, 6CKV; Southern Area, 6SUP. SEC: KME. ECs: Met. Sacramento, BVK; Walnut Grove, AYZ; Dunsmuir, JDN; Paradise (Chico Area), HBM; Roseville, GHP. RM: PIV. OBS: AF and BTY. OES: PIV and GHE. OOs: ZYV, BTY, GDO, and YV. OPS: JDN. Sac. Emergency Net (city) NCS AUO. SVS Traffic Net, 29.4 Mc., NCS ZYV, ANCS BTY. *Notice:* PLEASE MAIL YOUR REPORTS TO REACH THE SCM BY THE 2ND OF EACH MONTH! *Northern Area:* The Dunsmuir Radio Club has been organized with HPL, pres.; CFU, vice-pres.; HVB, secy.-treas. On the birthday of the Mission Trail, JDN and YNM had the Dunsmuir fire chief and mayor visit their stations. REB is on 7 Mc. and 160 meters. *Central Area:* ATQ checked in on 144 Mc. with indoor antenna; his sixteen-element beam came down in a storm. SLV reports sixteen-element beam on 144 Mc. the berries. OEX and VGJ are active on 160-meter 'phone. GVA puts Artois on the map on 28 Mc. TID is using screen grid modulation on 3.85-Mc. 'phone, 4-813s in parallel. CVU is on 28 Mc. KUI has VFO n.f.m. on 144 Mc. with discriminator on his receiver. FEW joins the Sac. Valley Traffic Net nightly. *Southern Area:* SARC officers are MIW, pres.; BTY vice-pres.; HGN, secy.; GZY, treas.; QDT, sgt. at arms. ASI is active on 3.85- and 28-Mc. 'phone. ZYV wants more towns to report in on the SVS Net for traffic. PIV is building new grid-dip meter. HFJ joins SVS Net. HOP is using phase modulation on 28 Mc. HSB and GDO worked PK3MR and PK3LC. ZF is converting BC-696A VFO and portable transmitter preparatory to traveling. Traffic: W6JDN 300, PIV 138, ZYV 114, HPL 42, ZF 41, CFU 39, KRX 37.

SAN JOAQUIN VALLEY — SCM, Ted R. Souza,

(*Continued on page 90*)

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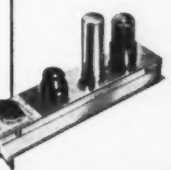

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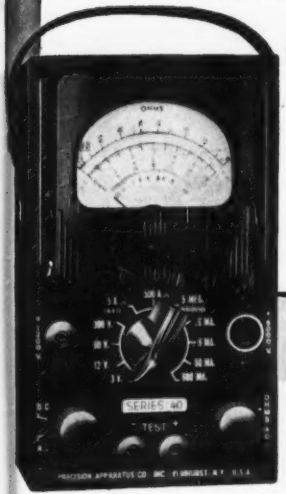

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W6FKL — Asst. SCM, James F. Wakefield, 6PSQ. SEC: JPS. ECs: PHL, AJE, WBZ. GUZ is the new SJVRC president, while GJO heads up the SARC. TFH is the new editor of *SKIP*. PDD has been appointed official technician for the SJVRC's station, TO. The Fresno Hamfest will be held Apr. 29th. SRU reports a fine DX-men's meeting in Fresno during January attended by about 70 well-known California DX men. The following are among those most often heard on 3.85-Mc. mobile in the section: BLU, EPQ ZNK, OXC, NGT, KPW, LTO, NJF, PDD, QON, WYT, ZYR, WJW, JPU, and IRQ. ZOI, PSQ, JPS, and KUT are in the process of building mobile rigs. HXR is a new call in Fresno heard on 1.9 and 7 Mc. WYT has a new 70-ft. pole in his back yard. ZOI is a CAA tower controller at Hammer Field. PHL is on 14-Mc. 'phone. OHB has a new final. MGM has a new Viking I. FYM took top section honors in the V.H.F. DX Contest. BCL is back on 144 Mc. with a new beam. EXH is converting 522 receivers for 50 and 144 Mc. GQZ is getting ready for the spring opening on 50 Mc. ERE is wondering how to raise a 60-ft. pole when he's surrounded by power lines. DVS still is working 28-Mc. DX. PJF is doing a fine job as Net Control on the YL Net. AJE is busy on the Legion and Teachers Nets and is laying the groundwork for a local emergency net. GRO is busy on the Legion Net and is rebuilding. HQY is a new call in Stockton. HU is a new ORS in Merced. Traffic: W6GRO 52, AJE 27.

ROANOKE DIVISION

NORTH CAROLINA — SCM, W. J. Wortman, W4CYB — The Catawba Valley Amateur Radio Club, in Hickory, now publishes a monthly bulletin, *Reading The Mail*. The Club runs a local net known as the Ridgerunners on ground wave, with EQJ as NCS. New officers are ENH, pres.; OXG, vice-pres.; ENQ, secy.; EBR, treas.; PHZ, act. mgr. FFU is working on a cottage by the lake. LSI is all the rage with the YL set as a disc jockey. DSO is back after a lay-off. FQC owns a new gas buggy and has mobile aspirations. EMV is the proud owner of new tube checker and signal generator. ENQ and LTW have new gas eaters — big car men — Studebaker-Chrysler and stuff. LTW has forsaken ham radio for part-time canasta. FUS has a new beam. Down at Duke, AHY is operated by the gang. Members of the Duke Club are 2NRF, SNH, 3OWB, 4INT, JMI, KKP, MAN, OBR, OFL, PHR, and 8ZSE. Club officers are KFC, pres.; PIB, vice-pres.; 3PXM, secy.-treas.; GJA, faculty adviser, and EL, trustee. The boys are running code and theory classes and have a big group ready for examination. Thanks to 3PXM for the letter and news. We finally heard a peep from the "mountaineers" up in Asheville. They have a new set of officers: MUV, pres.; DPF, vice-pres.; AFM, treas.; and R. J. Echerd, secy. Thanks for that information. Now what about that club transmitter and some dope on the gang? Ole FXU is having a hard time with club activities. Kick some life into OIX, Bob, and give us the dope.

SOUTH CAROLINA — SCM, Wade H. Holland, W4AZT — The South Carolina QSO Party, held Feb. 4th and 5th, was very much of a success. There was activity on all bands from 3.5 to 144 Mc., and we hope that the winners are happy with their prizes. Suggestions for similar South Carolina activities will be welcomed by the SCM. Plans are being readied for the May Picnic-Hamfest in Orangeburg, and BPD and DPN expect the entire State to attend. *Break-In*, our section ham magazine, made its first appearance in February and will be a monthly visitor. Be sure to send in your articles and information to the editors. FNC is the proud grandfather of Patricia Ann Whittington. Sanders Guignard, in Columbia, and Walter O'Cain, in Orangeburg, are busy with newly-arrived harmonics. OWW is on 7, 28, and 50 Mc. EDQ is strictly for 3.85 Mc. but dreams of an all-band rig with a pair of 304THs. The Charleston Club's new officers are OWW, pres.; NRC, secy.; and DFC, trustee. AZT was heard on 28 Mc. and c.w. at that. ANK still is South Carolina's top traffic man. Traffic: W4ANK 330, AZT 22, EDQ 12.

VIRGINIA — SCM, Victor C. Clark, W4KFC — Asst. SCM, E. Etheridge, 4KYD. SEC: IWA. PYV makes BPL again this month! PED advises that 44 students turned out for the initial code and theory class conducted by the Lynchburg Radio Club! The Wm. & Mary Radio Club (PYN) has affiliated with ARRL. BCI is new ORS; PWX new OBS. From NXN comes word of new PARC officers: OHZ, pres.; JXH, vice-pres.; NXN, secy.; AKN, treas.; MT, sgt. at arms. New AEC members are OST, PVA, and PYN. PWX relays traffic between VFN-VN and Marine Corps Net on 29.4 Mc. YEJ is silent while moving to new QTH. MWH is absent from VN temporarily because of rig trouble. AIV earns VFN certificate. The landlord chopped down IWO's 75-meter antenna; now he operates 28-Mc. 'phone with indoor wire. DTV is polishing up p.p. 813 final and planning mobile installation. JHI forwards information on Roanoke Club's new station. The Ocean View Club offered a prize to the high club member in 10-meter WAS Party; DHZ sounded like a strong contender. PAS likes new Select-O-Ject. PHM has 25 watts and "V" beam in Arlington. BCI, BZE, FF, FV, IA, IPC, JFE, JHK, KFC, KFT, KVM, KYD, LAP, MWH, NQV, PAS, PED, PYN,

(*Continued on page 92*)

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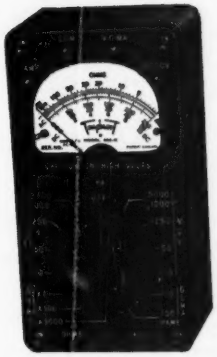

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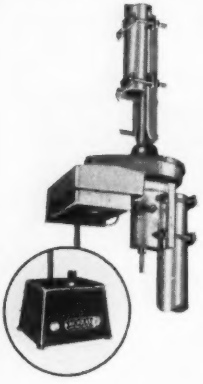

- Built in thrust bearing will support and operate antennas up to 250 pounds. Mounts antenna or mast up to 2" dia.
- Complete with control box and 60 feet of 4-wire cable.
- Magnetic brake to prevent turning by wind pressure, automatic mechanical lock at end of rotation.
- Pilot circuit keeps motor warm to resist ice and snow.
- ¾ RPM, instantly reversible, 370° rotation.
- ¼" shaft protrudes from bottom for coupling selsyn indicator (not furnished).

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Signal Corps type. Slightly used. Kit has seven 5' 6" sections of 1½" o.d. steel tubing, heavy ⅛" sidewalls, green enameled finish. One end of each tube is ferruled 6" for tight fit into next section.

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QWM, RQR, and VE were active in the January CD Party. KJT now is QFE at Patuxent River, Md. CLD reports success with 12-watt emergency-powered rig on VFN. KVM is back on VFN. FV knocked off 34 DX stations in four days on 3.5 Mc. using only 10 watts! CJS is working excellent DX on 7 Mc. including LX, YO, HA, and FA9. NNN is working Gs, VE1, and KV4 on 160-meter c.w. PVRC members are haggard from the DX Tests. JDL, JHI, and RQR renewed OES appointments. Traffic: (Jan.) W4PYV 508, FF 178, LAP 153, PYN 141, KFC 71, FV 64, NRO 60, IA 52, MLH 26, KYD 24, CLD 22, IWO 21, JHI 17, DTV 16, NXN 13, IWA 11, II 4, CJS 3, NQV 1. (Dec.) W4PAS 54.

WEST VIRGINIA — SCM, Donald B. Morris, W8JM — EVR's activity allowed 2QHH to be the first station to work YL-WAS. KWL cleared all TVI from his neighbors and now runs his 600-watt 28-Mc. 'phone free of TVI. OXO was visited by DYP. YGL/ESQ handled traffic during the high water floods on the Ohio River. WSL, with Collins 32V-2 and 75A receiver, has confirmed over 75 countries on 28-Mc. 'phone in a short time with limited operation because of illness. Beside WVN and TLC, GBF handled a large amount of traffic from the Tampa Fair. MARA is looking for a site of land suitable for a proposed club-house so SP can be operated regularly. VCA, with a three-element beam, now joins the following ground-wave gang on 28-Mc. 'phone: JRL, ESQ, AEN, WVF, NTV, MIS, DHT, QG, KWL, EP, WSL, and JM. PQQ snagged ZS9 and CR7 on 7 Mc. UHK, now in Weston, is active on 3.5 Mc. AUJ worked Puerto Rico on 3.5 Mc. in the daytime. Don't forget the West Virginia QSO Party, starting April 1st. Traffic: W4GBF 279, OXO 262, DFC 54, AUJ 51, BWK 38, EZR 26, PQQ 12, JM 7.

ROCKY MOUNTAIN DIVISION

COLORADO — SCM, M. W. Mitchell, WØIQZ — SEC: KHQ. RMs: ZJO, LZY. Because of MARS and other activities, IC is resigning the c.w. SEC appointment; just when he was getting a good start, too. LZY is looking for new recruits on CSSN at 1830 MST Mondays through Fridays on 3560 kc. The Colorado Springs and Pueblo hams set up a net for emergency use during the disastrous fire near Colorado Springs. Those taking part were SGG, KVD, GBU, HDU, and LZY. The boys did a good job organizing the net in a short time but it turned out that they were not called upon. SLN set up his 28-Mc. rig at the annual Stock Show in Denver and handled several hundred messages for those attending. ZJO got his 35-w.p.m. sticker. IA is plagued with bad power leaks despite repeated protests to the Power Company. PNK is finishing up his 3.85-Mc. mobile rig. New hams at Lamar are AJJ and FAT. CUG transferred to Washington, D. C. ZJO made BPL this month. The Denver Radio Club bought up some surplus United Air Lines radio gear and auctioned it off for a neat little profit for the club treasury. Traffic: WØZJO 955, IC 400, IA 47, LZY 39, PNK 30, OWP 5.

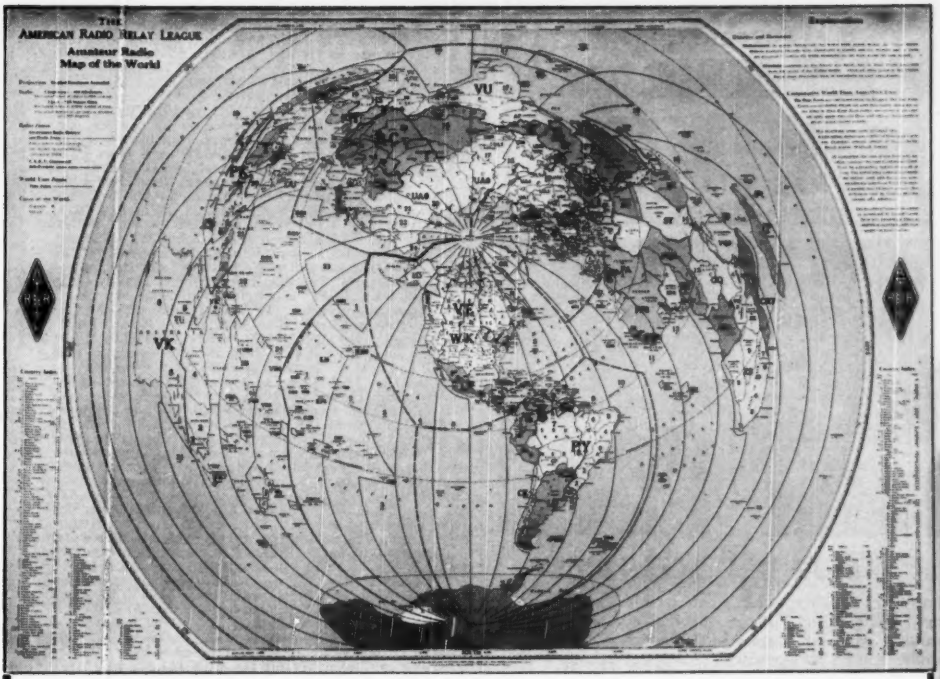
UTAH — SCM, Leonard F. Zimmerman, W7SP — This is the first report from your new SCM, as Utah launches its career as a separate section. New UARC officers are NXM, pres.; CFF, vice-pres.; and OOK, secy. *The Microvolt*, the Club's interesting little monthly will be continued with JVA as editor. CEI is organizing a mobile net with the coöperation of the CAP, NCR, State Police, SLC Police, and the SEC. The u.h.f. gang has established 8:00 P.M. each night as a calling and listening period from 11 to 420 Mc. Civilian Amateur Radio System, CARS, is a revival of the old 9th C.A. AARS and is going FB with many old-time AARS men. Utah's frequency is 3700 kc. If interested, contact ZZZ or IS. FRN and family have moved to Las Vegas. SYD, DTB, LKM, GPN, and MFQ are members of the new Transcon. 'phone net. Traffic: (Jan.) W7UTM 92, MFQ 60, LKM 10, SP 6, JVA 4. (Dec.) W7UTM 364, LKM 81.

WYOMING — SCM, Marion R. Neary, W7KFV — DXV finds low power gives good results on 28- and 3.85-Mc. 'phone. MVK, with new Class A license, works mobile 3.85-Mc. 'phone. OWZ made contact with Denver on 144 Mc. IRX is wearing out shoe leather in the back yard trying to find an antenna for an ART-13 to work on all bands. ILL is heard nightly on 1.9-Mc. 'phone. NOU is heard with a potent signal on 3.85-Mc. 'phone. MOD found plenty of QRM on 1.9 Mc. NLH finds a good antenna helps on 3.85-Mc. 'phone. JDB received OO appointment. Drop a card to your SCM for details on all appointments. PGS and KFV are designing a "super-special" 14-Mc. rotary beam. GGG is pounding brass on all bands, but likes 3.5 Mc. best. Please send in a monthly activity report on the first. Club secretaries can collect the latest news at your meetings and forward. Traffic: W7DXV 68, HNI 31, ILL 24, IQQ 22, KFV 18, NLH 10, IRX 4, FLO 2, JXJ 1.

SOUTHEASTERN DIVISION

ALABAMA — SCM, Leland W. Smith, W4YE — ITZ, DAQ, OBC, ODS, OKJ, and OKF are newcomers to 4-Mc. 'phone. IMK will be on 4 Mc. as soon as he gets Class A license. MAB still is collecting big bottles for his kw. HFL has new rig at home. ELX has new shack. MUU has

(*Continued on page 94*)



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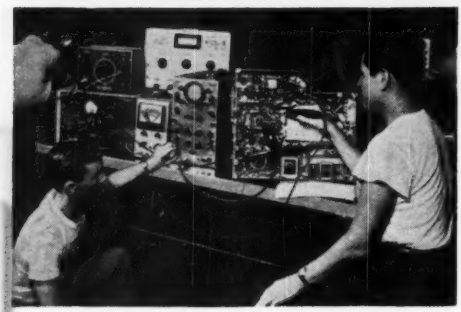

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gone 28-Mc. mobile. AXU is active on 14 Mc. OBV made over two hundred contacts while convalescing from motorcycle accident. K4WBA is new ham in Mobile. MEM has p.p. 81s on 14 and 28 Mc. The Auburn Radio Club has a practice c.w. net on 7230 kc. at 8:00 A.M. daily. BMM is rebuilding with p.p. 810 final this time. ETY is new Dothan Radio Club call. OUU is sold on his new 28-Mc. beam. GSO has moved to Tennessee. MARS has some Alabama vacancies. Write MVM for the dope. NPU has his 4-Mc. vertical going at last. HYV reports progress on his new kw. rig, which should be finished by summer. New officers in the Anniston Club are LEN, pres., and OAO, secy.-treas. PGO has moved to Selma. YET is active at K4FAG. MBA, our SEC, is bringing our EC work up to date. Write him for EC details. DAL visits us via 4-Mc. mobile. Traffic: W4EWN 222, SLJ 96, GJW 82, YE 52, KIX 51, BFM 9, JYB 8, MVM 6.

EASTERN FLORIDA — SCM, John W. Hollister, W4FWZ — Thanks to the fine schedules lined up by RP, much traffic has started to speed away from the Tampa Fair, ALP reports. Those holding schedules include AYV, ZC, IQV, OAV, MNT, and RP. The informal hamfest at IJ's was a bang-up affair. GY walked away with the first prize, a receiver. Brookesville: MNT now is 16, and finally got the bugs out of his 457A. Daytona: OAV is off to Alaska with the CAA and will be on from there. Tom reports that the Halifax Club is reorganizing with LZT as president protem, and that ASR is leaving us soon. PYB has been appointed ORS. Deland: WS reports unusual conditions on Feb. 11th at noon when W2s, 8s, 9s, and a 6 were rolling in on 3.85-Mc. 'phone. Ft. Lauderdale: BMR has been appointed OO, Class III. Lakeland: NAK (EC) has the AEC going in fine shape with five new members. He reports the Club has started a school for beginners and has eight applicants. LMG is Asst. EC. Lake City: IQV got ideas from the dope in the CD (ARRL) Bulletin to get rid of TVI on 3.5-Mc. c.w. Miami: IYT schedules K3FMC and KZ5PA. The Dade Radio Club is in new Red Cross Bldg. with large air-conditioned room. Sarasota: LMT, appointed OPS, is building a classy desk for the living-room rig. Jacksonville: Editor EEW sure is putting out a fine *JARS BEAM* and LZM's DX column is tops. 1SS, in Boston, read the remark on HGO's dope on 'phone patches in the *Peanut Whistle* and asked for dope which AXY says he will send. Well, the DX Contest got off to a good start and IQV (OO, Class I) found several zealous (or jealous) ones outside the low end of 7 Mc. Flash: FJU is back on 3.85 Mc. It's good to have 9DDC/4 back with us. Traffic: W4IQV 184, OAV 142, RP 107, MNT 101, IYT 43, KJ 41, BMR 24, LMT 13, FWZ 10, NAK 10, BT 2, PYB 2.

WESTERN FLORIDA — SCM, S. M. Douglas, jr., W4ACB — Monthly reports? We haven't had any lately. You know, the only way we can find out anything is for each member of the section to take time to drop us a card, listing his activities, before the 6th of each month. The Fish Net operates nightly in Tallahassee with OCL, LDT, NQY, BSR, and GAA in on it. CCA, in Bainbridge, also gets in occasionally. Frequency is 28.6 Mc. DAO is back on 28 Mc. NN is heard regularly in Pensacola. NWC visited Tally recently. HJA works 3.85-Mc. 'phone (portable) in Milton. DLO is working 7 Mc. again and is heard throughout the section. ERR has new Class B ticket. MS has gotten his mobile transmitter in the Dodge. DZX has moved to California. The EQZs are hinting at activity soon. BOL, Southeastern Division Director, visited the Pensacola Club recently. Don't forget those reports, gang.

GEORGIA — SCM, Clay Griffin, W4DXI — The Georgia Tech. Radio Club, AQL, is planning to handle lots of traffic during Engineers' Week; so look for them from April 25th to April 30th on 3945 and 7110 kc. The Club has moved into new quarters and has separate operating positions for 3.5, 7, 14, and 144 Mc. GQR, of Cartersville, reports that he is on 50 Mc. with a 15-watt rig and a two-element beam. IRL graduated from Georgia Tech. and is back home in Thomaston in business with one partner. Lanier High School has a station, PFA, on 28 Mc., and has a beam on a 60-ft. steel tower. KSZ, ex-2HWG, 8RIW, sent some news from Columbus: MBS is operator at WRBL; BYV has a new mobile rig; MCB is on 28-Mc. 'phone with a 150B; IZV has been active from his home location and from USNR depot; KSZ, a new ORS, has been meeting traffic nets with a 60-watt rig. He is rebuilding for an 813 final. PZL is a new ham, and FVL is new in Columbus. KGP, Savannah, has a three-element wide-spaced beam for 28 Mc. Traffic: W4IRL 31, KGP 15, DXI 10.

WEST INDIES — SCM, Everett Mayer, KP4KD — GP and DJ set up San Juan-Arecibo circuit for possible emergency traffic on the occasion of a large fire in Arecibo. DJ now has doublets for 3.5, 7, 14, and 28 Mc. AZ has new beam and plug-in rigs for all bands. IN is building half-gallon 3.5-Mc. rig for DV. W2QHH checks in on Puerto Rico AEC Net on 3.5-Mc. c.w. to add new KP4s to his string. KV4AB/KP4 is on 28 Mc. with 100 watts. HU works nice DX on 3.5 Mc. KP4FU/KV4 and W4OLC/KV4 are on 3.5-Mc. c.w. and 3.85-Mc. 'phone. W8UW/KP4 joined the C.A.A. in Puerto Rico and works with KD. KD added 160 sticker to his DXCC. PRARC directors' meeting and hamfest at LB's QTH was well attended. W4NHG visited

(Continued on page 96)

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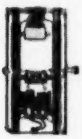

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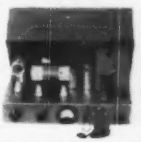

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Puerto Rico on C.A.A. business. RJ and KD are sweating out DX through high noise levels. HZ racks up nice new DX on 28 Mc. with new beam. KD has been appointed Assistant Director. Traffic: KP4LD 31, HU 15, DJ 8, KO 7, KP 4.

CANAL ZONE — SCM, Everett R. Kimmel, KZ5AW — SEC: GD. ECs: FL and NM. RM: PA. PAM: WJ. WJ succeeds CG as PAM. Our RM, PA, announces the Crossroads Net, CRNET, now is a regular traffic net meeting Mon., Wed., and Fri., 7150 kc. at 2200 EST, with outlets to W4-Land. PC transmits 28-Mc. code practice thrice weekly. EC FL, with a new 75A-1 and 301C also is our new Assistant Director. CG, CO, and WJ sprouted long wires for 14, 7, and 3.5 Mc. WJ and PA made the first 3.5-Mc. transisthmian 'phone contact. CO says his long wire seems to have a major lobe toward SM-Land. LR schedules Nashville thrice weekly on 28 Mc. Fisherman John, seagoing sage of Panama Bay, hooked his ticket. They gave him FJ. Next night he was helping PC with the code practice runs. WA, just licensed, is building two rigs. LH surprised the SCM with a 'phone patch from a long-lost stateside friend. Traffic: KZ5CO 24, FL 20, LR 8, RM 6.

SOUTHWESTERN DIVISION

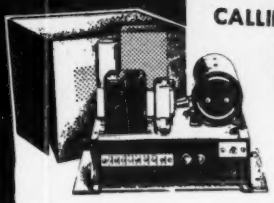
LOS ANGELES — SCM, V. A. Gentry, jr., W6VIM — Thanks for the honor in electing me as your SCM. I'll do my best to carry on the excellent work started by IOX. The CD files and voting record indicate that Vince has set an example that is going to be tough to beat. CUF has gone VFO. FMG's light traffic report is caused by television viewing, not interference. FZO and EBR have gone supermodulation. MU schedules 9GZT and VE6PP daily except Saturday and Sunday at 10:30 A.M. PST. YLZ has been back East on business. CMQ gave a series of talks before the Pasadena Short Wave Club on "Radio Test Instruments." In spite of considerable TVI QRT during the 28-Mc. WAS Contest, VAQ worked 33 states; and on 7 Mc. worked ZS2A to make WAC on 7, 14, and 28 Mc. Radio clubs announce new officers as follows: Metropolitan Radio Club of Los Angeles — V. J. Short, chairman; GRZ, secy. Ventura County Amateur Radio Club — SES, pres.; CIC, secy. The Long Beach Club officers will be installed at a banquet in April. IDU and SES hold c.w. practice near 3.7 Mc. on Mondays and Wednesdays from 8:00 to 8:30 P.M. AWY, QFT, and HHG claim that their TV receivers are for experimental purposes and not entertainment. They have no TVI, even on their own receivers. TFC reports that the San Fernando Valley Club had a transmitter-building contest against time. The winning team of four required 14 minutes, 11 seconds to complete its transmitter. YSK/6EAJ worked 14 states on 160 meters. CTJ and YCZ are stirring up 144-Mc. activity. OOU now is located in Paso Robles. MYI is getting more DX on 14 Mc. since he has changed antennas. BUK cleared the bugs from his transmitter on 14 and 28 Mc. and has a new VFO. BHG made OTC and RCC. The Long Beach VHF Net has started with LSN/mobile as Net Control on 144.138 Mc. DSO and EFE are on 420 Mc. CYI has rebuilt his final so often that the chassis looks like a sieve. WHH has had Clapp oscillator trouble. LYG is on 7- and 28-Mc. 'phone. AAE recently received his third postwar ORS endorsement. We regret to learn of ESR's resignation as SEC. During the year in which he served as SEC, Sam organized and built the Los Angeles section's AEC to a place where it ranks with the best in the country. In our opinion the job of SEC is one of the toughest of CD appointments. This speaks well of ESR and requires that full support and respect be given his successor. Traffic: W6CE 2063, YLZ 350, CMN 278, LYG 199, IOX 151, ANT 88, QAE 74, BHG 43, JQB 35, MU 20, FYW 14, CUF 12, YSK/6EAJ 6, FMG 2, YVJ 2.

ARIZONA — SCM, Gladden C. Elliott, W7MLL — BH, in Mesa, is on 7-Mc. c.w. QJL works Phoenix on 420 Mc. KRW has a new four-element beam on 28 Mc. The Mesa gang works Maricopa regularly on 28 Mc. LHM, OAO, and NYU are on 160 meters. HDO and MAW are on 160-meter mobile. UPR claims 120 countries. QFI and 6HWN are mobiles in Phoenix. JRK has 400 watts on all bands. MHP, NYN, and NWA are on 27 Mc. JUV is on 27 and 28 Mc. 6UXA is portable near Phoenix. Radio Club of Arizona officers are OIF, pres.; JOK, vice-pres.; KUZ, treas.; OAS, act. mgr.; RIJ, secy. The Southside Radio Club did a nice job handling Maricopa County Fair traffic. SNI, NUL, and SQN report one-way work into Flagstaff on 28 Mc. About 25 turned out for the Arizona c.w. party on Feb. 5th. LUK gave a very fine talk on teletype to the Radio Club of Arizona. JMD is a new Phoenix call on 28 Mc. LJN has a new antenna on 3.85 Mc. LBN has a new home-built frequency standard. MAL is on 7-Mc. c.w. MAE is doing a fine job on traffic. LFZ now is 6FNH. QNO has gone mobile. LVR, RNB, JVK, LZP, and MLL run code practice on 28 Mc. Listen for the Arizona gang on 3865 and 3515 kc. evenings and 7200 kc. Sundays at 10 A.M.

SAN DIEGO — SCM, Dale S. Bose, W6BWO — YYN came up with the high traffic total in the section this month. YXE had only about three hours on the air this month as AEC work kept him pretty well tied down. YYM is new OO and also took part in the YL/OM Contest. DBZ has new VFO going and is trying to lick the antenna problem so he

(*Continued on page 98*)

POWER SUPPLY SALE



CALLING ALL MOBILERS!

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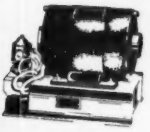
$42.50 6 VOLT HT-11 POWER SUPPLY, ONLY $19.95

NEW! COMPLETE! Compact filtered supply made by HALLICRAFTERS for the HT-11 xmtr and revr Ideal for mobile rig in your car, boat or plane Includes Mallory VP-552 vibrapack which regularly sells for $15.43 ALONE. Also has 6 volt dynamotor, fused line, connecting block, relay control, etc Transmitting voltage: 6V at 15A; out 350V at 160 mils Receiving: 6V, out 225/250/275/300 at 100 ma. Completely encased in gray crackle-finish metal 11 x 8 x 9" case! Wt. 31 lbs. First TWO-DOZEN lucky Hams will clean us out — first come, first served!

NOTE. We also have SIX 12-volt supplies similar in every other way to the above, also made by Hallicrafters for HT-11 On your order specify this as first or second choice in case we are sold out of one type Write phone wire TODAY!



GO MOBILE WITH THESE G.E. 6 VOLT DYNAMOTOR SUPPLIES

XMTING $8.95

RCVING $4.95

BOTH $12.95

Made by General Electric and originally used for police cars Both base-mounted and in used condition

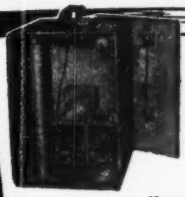
TRANSMITTING DYNAMOTOR SUPPLY — **$8.95**

Perfect for car or boat; filtered. In 6V at 22A; out 300V at 160 ma. 11 x 9 x 8" 36 lbs Can be used to replace the scarce PE-103!

RECEIVING DYNAMOTOR SUPPLY — **$4.95**

Companion to above unit, and also filtered, base mounted, used In 6V, out 250V at 100 ma. 9 x 6½ x 6" 11 lbs.

SAVE ANOTHER $1 — BUY BOTH FOR ONLY **$12.95!**



1 METER PLUS, UHF XMTR/RCVR, ONLY

$3.25

Covers 245-240 mc Ham band. Frequency range 234-258 mc. Has Hi-Q gold-plated cavity resonator for stability. Originally used as Navy TS-1/ARR-1 test oscillator Has two 955 tubes as modulator and r.f. Cabinet alone is excellent foundation for test equipment, transcerivers, etc. New in original canvas cover. 9½ x 6¾ x 6½" Wt 10 lbs. Limited supply, so HURRY!

$19.95 G.E. 33⅓ Record- Player, $6.66

Brand new General Electric 33⅓ LP attachment, originally sold for $19.95! Quiet AC motor, compact plastic case. Includes G.E. magnetic cartridge with replaceable sapphire stylus — alone worth almost our fantastically low $5.66 price for the entire unit! With power cord, switch, instructions. Requires preamp.

SPECIAL RADIO SHACK MICROPHONE SCOOP!

Record-Low-Price CRYSTAL MIKE!

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3 for $8.00

Lowest price EVER. Exclusive special purchase of a famous-maker's $6.50-value crystal mike (crystal element alone is exact replacement for his 810 units)! Excellent response 100-6000 cycles, ideal for public address, entertainers, hams, recording, etc. Streamlined metal case, 6½ ft. cable. Sensitive! Brand new! Only $2.85 each, 3 for $8.00.

10 Henries, 150 Mil CHOKE, Only $1.45

REGULARLY SELLS FOR $2.95, you save over ½! Hermetically sealed, isolantite terminals 4 x 3 x 3" Ideal for all types of power supplies Base mounted 4 lbs

OIL CONDENSER SALE: LOW? LOWER? LOWEST!

MFD	WVDC	Net
*4	600	$0.55
6	600	.79
**10	600	.79
.2	1000	.55
*8	1000	1.55
10	1000	2.25
2	1500	1.05
4	1500	1.95
6	1500	2.50
.5	2000	.95
2	2000	1.87
*.1	3000	.95
*.035	3000	.95

*Metal can, tubular. **2 x 5 mfd

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DRAKE TVI FILTERS FOR TV RECEIVERS

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NATIONAL SELECT-O-JECT

The amazing Select-o-ject boosts or rejects any audio signal (90 cps to 8,000 cps.) 38 db! Supplied with full instructions for connecting to any receiver capable of supplying 6.3 v. at 0.6 amp. and 200–250 v. at 4 ma..... **$24.95**

MIDGET 300 OHM LINE ANTENNA RELAY

Double Pole, Double Throw!

300 ohm transmit-receive relay. Up to 500 watts RF on reasonably flat lines. (Measured on input.) Silicone glass insulation. Size 1⅞ x 1 9/16 x 15/16"

Advance Relays

K1504 R.F., 115 ACV; K1604 R.F., 6DCV... **$2.70 ea.**

72 to 300 OHM MATCHING TRANSFORMER

Matches 72 ohm coaxial cable such as RG59U to 300 ohm receivers. Voltage step-up 2:1 with a flat response over the TV channels from 52–215 mc. Negligible mismatch when used with 52 ohm coaxial cable and W-100 adapter. Model T-72. An RG59U adaptor furnished.

$2.40

Brand New UTAH HEADPHONES

125 Ohm DC resistance

Type H.S.-16A. Canvas web headband. Long, standard type cord.

$1.95

Oops . . . Sorry!

In the March issue of *QST* we advertised, thru error the Bell Record-O-fone RT-50 for $86.50. This should have read:

BELL RECORD-O-Fone

Model RT-50 $106.33

We regret the error.

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can get in a little more traffic work. The San Diego AEC really is going to town with surprise drills held every couple of weeks and is receiving a lot of good publicity in the local newspapers. HQD and FPW/6 are new arrivals in Orange County. Dan Harris, a local Santa Ana fireman, hopes to get his ticket soon. DEY has a new low-power 807 rig on 3.5 to 29.7 Mc. Also he visited WVR at Oakland recently. The local boys are building TV filters for their rigs, more to keep peace in the family than for the neighbors, as most of the hams have the squint boxes themselves. FCT has been checking in on the Southern Border Net along with BAM. There is no news from the El Centro gang. How about some reports from you guys in Imperial Valley? Traffic: W6YYN 454, ELQ 184, FMZ 72, YXE 11, YYM 8, BAM 5, FCT 4, DBZ 2, DEY 2.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, Joe G. Buch, W5CDU — Members of the emergency nets again proved their value in rendering service to isolated cities while communications were disrupted during severe ice conditions. Section amateurs, assisted by Naval mobile units and manned by amateurs belonging to the Naval Reserve, lost no time in getting emergency communications to the isolated area. Our sincere thanks to all participants and to the many who were QRX, ready and willing to assist. We welcome 5CTM to Paris; Paul is ex-ØCTM and ex-5ARE. ØTAP also is in Paris. AWT is newly-elected president of the Big Spring Club with PSI, vice-pres.; and NUJ, secy.-treas. We extend best wishes to Mel and the other members. LTY and QXM are neighbors in Ft. Worth. JAY is fighting TVI. Thanks to PCO for the net directory of the El Paso Emergency Corps outline of standard operating procedure for use in emergency work. LGY has made several improvements on her 3.85-Mc. rig and is working lots of states for WAS on 3.85 Mc. GZU, who makes BPL for the 12th consecutive month, has found it necessary to take a vacation for the present from trunk line traffic. IIP, HBE, and QS lost their beams because of ice loading. AJ is running 600 watts on 3.85-Mc. 'phone. Jim Lee, our SEC, moved his BC-610 over to the QTH of Assistant SEC, BKH. Bill put the rig to good use during the emergency. IUW now is stationed at Reese AFB, Lubbock. Traffic: W5GZU 885, LSN 851, ARK 137, CDU 117, BKH 52, LGY 19, LTY 6.

OKLAHOMA — SCM, Frank E. Fisher, W5AHT/AST — SEC: AGM. PAM: ATJ. The ACARC of Oklahoma City is working on details of participation in electronic tornado tracking in coöperation with Oklahoma A. & M. College. NMM has closed down preparatory to moving. Carl has been a stalwart in OLZ and is sorely missed. HLD has 400 watts on 144 Mc. with sixteen-element beam. 1PHE is operating fixed portable on 28 Mc. in Oklahoma City and soon will be heard on 144 Mc. EHC is worrying about chirps on his 7-Mc. rig. Blackwell is to be congratulated on its new club, Pioneer Radio Amateurs, affiliated with ARRL. Activities in general seem to be dull this month judging from reports, or rather the lack of them. The OLZ slow-speed net has added about five new members but response to this opportunity of operating training has not been up to expectations. How about participation in this or other useful activities? The tornado and flood season is approaching. Are you prepared? Does your EC or SEC know about your ability to help? Traffic: W5OWV 217, OQD 143, PA 89, FOM 83, AHT 57, OYP 44, MEZ 28, ADB 9, EHC 8.

SOUTHERN TEXAS — SCM, Ammon O. Young, W5BDI — Houston doubled its DXCC population in the period between December 13, 1949, and February 7, 1950. The newcomers are BDI; JWM, with the first 'phone DXCC in town; and NMA, with the first 28-Mc. 'phone DXCC in town. LXY needs only three more cards for his DXCC. ADZ is putting his 167-BY in his new shack. NOT is building a four-element 14-Mc. beam. OFM is working 28-Mc. 'phone DX. IYR is back on with an 813 on 14 Mc. — it is the buffer for a pair of 304TLs to be put on later. NMV reports a 28-Mc. demonstration for the Orange Red Cross. PCO reports quite a bit of activity in El Paso emergency work. FNY is doing a nice job in a newly-organized club in San Antonio. JBZ has his big rig on 3.85 Mc. MN has new buffer to kick 250THs. DAA is working with the Kingsville Red Cross. Traffic: W5MN 318.

NEW MEXICO — SCM, Lawrence R. Walsh, W5SMA — SEC: BYX. RM: ZU. PAM: BIW. PAM v.h.f.: FAG. KYB is on 3.85 Mc. with 800 watts to 813s. AKQ is on 28-Mc. 'phone. PLK is on 28-Mc. 'phone with 300 watts. QKJ is increasing power to 150 watts. QNQ is converting two ARC-5s to 3.5 and 7 Mc. BYX is building another five-element beam for 144 Mc. BIW has two new 40-foot antenna masts for his 75-meter antenna. JXO has a Collins 32V-2! 7LSK/5 is operating on 3.85-Mc. 'phone. OMR is 3.85-Mc. mobile. NRP is using super-modulation. MSG holds code practice the 1st and 2nd Wed. on 3700 kc. NJR has a CF multiband antenna and SMA has a half-wave fed with 300-ohm ribbon. ZU is new OPS. NVR is building an s.s.b. adapter for his receiver. BYX, Hot Springs, worked JOT, El Paso, on 144 Mc. at 9:55 P.M. Feb. 13th. New schedule for New Mexico State Net is Tuesdays 8 P.M. on 144 Mc. QFG has a twenty-four-element horizontal beam. OPN and ONP are ready to go on 144 Mc. LWL has a six-

(Continued on page 100)

TERMINAL leads with HARVEY-WELLS!

New BANDMASTER transmitters pack the wallop and cost but very little!

HARVEY WELLS BANDMASTER JUNIOR — TBS-50B

30 to 50 Watts with simple switching to select any of 8 Bands, 80, 40, 20, 15, 11, 10, 6 or 2 Meters with no plug-in coils and with 100% break-in operation. Has a brand new crystal-VFO switching circuit which can readily follow a fast fist, even with sluggish crystals, or you can still have break-in with your external VFO. A pi-antenna matching network built-in with integral antenna coupler is provided to load a stubborn antenna or to adjust excitation if the Bandmaster is used to drive a big final. With an AC power supply capable of delivering up to 450 Volts at 275 Ma. the Bandmaster is ready to go to work as a top-notch fixed station transmitter. With a vibrator or dynamotor power supply you're all set to go portable or mobile. To clinch the deal, anytime the proud owner of a Bandmaster Jr. gets the urge to make with a microphone, there is available at low cost the Junior Modulation Kit to easily convert this rig into a plate-modulated phone job.

Complete with tubes, less power supply..... **87.50**

BANDMASTER JUNIOR MODULATION KIT

to make a Bandmaster Sr. out of your Jr..... **15.50**

39.50

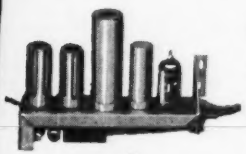
APS-50

A sturdy power supply with good regulation for fixed station operation of any Bandmaster. Delivers 425 V. at 275 Ma. and 6.3 V. at 4 amps. May be mounted on rack panel. For 110 volts A.C. 50-60 cycles.

BANDMASTER SENIOR — TBS-50C

A complete Phone-CW transmitter. The Senior is a modernized version of the popular TBS-50 with all the new and exciting features of the Bandmaster Jr. incorporated plus built-in high level modulation for phone operation with a carbon mike.

Complete with tubes, less power supply..... **111.50**



CMA-50

Crystal microphone preamplifier. The unit built into the Bandmaster Deluxe which you may add to other Bandmaster models. Simple to install..... **22.00**

VPS-50

Although developed especially for use with the Bandmasters this is also a fb power supply for use with other mobile equipment. It delivers 300 volts DC at 200 Ma. with 6 volts DC input.

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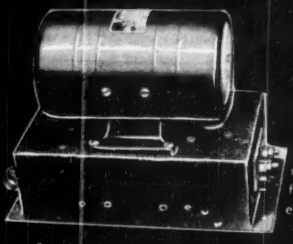
BANDMASTER DELUXE — TBS-50D

The ultimate in a flexible and versatile Phone-CW transmitter. The Deluxe has all the features of the Jr. and Sr. Bandmasters plus a high-gain speech amplifier to permit phone operation with a crystal or other high-impedance microphone. A great many have been sold to foreign countries for use in commercial applications; vivid proof of the Bandmaster's quality and adaptability. Complete with tubes, less power supply..... **137.50**



DPS-50

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For 6 volt operation (delivers 300 volts @ 250 Ma.) **87.50**

For 12 volt operation (delivers 400 volts @ 250 Ma.) **54.50**

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AMERICAN RADIO RELAY LEAGUE

West Hartford 7, Conn.

teen-element horizontal beam 50 feet high. ESZ is moving to 420 Mc. NAI has a Helix beam. JXH has an eight-element beam. MJI has completed a tuned-line RF into a 733D receiver. Traffic: W5QKJ 521, ZU 113, NXE 68, JXO 52, A5ZU 46, A5OIA 25, W5NRK 21, A5OCK 21, W5NJR 19, HSO 18, NKG 18, SMA 16, QNQ 10, OCK 9.

CANADA

MARITIME DIVISION

MARITIME — SCM, A. M. Crowell, VE1DQ — EC: FQ. KS sends Official Bulletins Tues. at 6:30 P.M. and Sun. at 10:00 A.M. AST on 3830 and 14,190 kc. respectively. ES does a bit of ragchewing on 3620 kc. and has built a 'scope and new converter, per *Handbook*. DQ appeared on 3.8-kc. 'phone again to work the local gang, including QG, who promptly QSYed to 160 meters for a test of the new rig. DB snagged AP2N, Pakistan. FQ, HARC president, accompanied about twenty of the Halifax boys on a trip to Mount Uniacke, sponsored by the Air Force, to view the FB installation there. The HARC P. O. Box number is 663 if you want a short QTH. The technical committee is continuing under HJ. Send him your problems. 3AMK recently visited FQ and DQ while in Halifax. Maritime Net ('phone) members are being issued certificates to all active members via the Net secretary, LG. The following were logged on 3.8-Mc. 'phone in one hour: KF, IC, MQ, NX, TS, VI, LM, TO, YV, AO, LO, NB, VN, QX, UC, IM, and BC. On c.w. the same period were HC, GC, and HJ. LZ has a nice new 3.8-Mc. 'phone rig to supplement the "big rig." Send in your reports, gang, the 1st of the month. Traffic: VE1HC 23, MK 23, DB 19, FQ 18, KS 16.

ONTARIO DIVISION

ONTARIO — SCM, Thomas Hunter, jr., VE3CP — Asst. SCM c.w., M. J. McMonagle, 3AWJ. Asst. SCM 'phone, E. B. Kimble, 3FQ. SEC: KM. RMs: ATR, AWE, BMG, BUR, DU, GI, TM, and WK. PAMs: BSA, DF, and BSA. New appointments include WY as EC, AJU as OO, IB as OPS. FU has 135 watts and three-element beam on 28 Mc. ZO has new location and is on 3.8 Mc. BXJ is on 7200 kc. regularly. The Ontario 'Phone Club has plans for another picnic. DBP, Waterloo, and DAH, Georgetown, are new to 144 Mc. Activity on 144 Mc. is showing a large increase across Ontario with about 30 on from Toronto. BNQ is piling up countries and now has 119. BIK and AOK are using super modulation. ALU is on 50 Mc. from Kirkland Lake. DDM reports for the Sarnia gang. BMW and DDM are only 14 years young. DDL is on 28 Mc. with 6 watts. BPE is after ORS appointment. BER is operating mobile. The Northern Ontario Net is working daily on 3842 kc. at 7:30 P.M. YD has added double conversion to his receiver. New Kingston Club officers are BDA, pres.; AOU, vice-pres.; BFK, secy.-treas.; CAQ, act. mgr. ATL is on 7 Mc. from Kingston. AXT is president of McMaster University Radio Club. GG has new SX-45. IB is operating VFO. AHR enjoyed his first LO-Nite. AGT is back in Oshawa and on 3.8 and 28 Mc. BXL is on 14-Mc. 'phone. QE has 31 countries on 7 Mc. AJP, GN, CCD, ANO, AOR, and BMG are on regularly with AFARS on 3715 kc. under GG. ALD runs 24 watts in the next room to the 5000 watts of CHOK. BTI is EC for St. Catherines. BL completed WAS. Traffic: VE3IA 189, BUR 173, DU 128, WY 125, GI 119, WK 96, ANO 94, ATR 89, BL 73, BMG 56, NI 54, IL 51, BER 50, TM 43, BUG 41, BTQ 40, CP 39, BBM 35, APS 32, BSA 30, DF 29, AZZ 28, YJ 27, AZH 26, VD 14, AYW 13, ADN 12, AG 12, KM 12, AER 11, HK 10, RG 9, BNQ 6, DCW 6, DBJ 5, YS 5, AKJ 3.

QUEBEC DIVISION

QUEBEC — SCM, Gordon A. Lynn, VE2GL — SEC: SA. ECs: BB, TA, ZZ, JN, QN. RMs: BB, GM. PAM: DX. YZ, ex-4RT, is on 14-Mc. 'phone from new QTH in Valois. BG is on 3.85 Mc. with n.f.m., and is meeting plenty of old-timers. Red Lymburner, ex-2IC, now is 3XD and sends his greetings to the gang. AKJ reports difficulty working Montreal on PQN because of radio disturbances. AB participates regularly in Frequency Measuring Tests and obtains excellent results. Call him for frequency checks. QN reports Quebec City Emergency Net going fine and the gang has had lectures on map-reading and the building of mobile equipment. JN has installed extra battery in car-switching series or parallel, using BC-454 receiver as converter in car. LO is maintaining daily schedules. TM finds it necessary to resign from ORS and OBS appointments. PQN continues to operate daily at 7 and 10 P.M. on 3570 kc. but more stations are needed to give greater coverage of the Province. Look in on 3570 kc. at 7 P.M. and see what goes on, then crank the rig down and get in on the net. AKM, Canada's 11th sightless ham, is on 7079 kc. with 25 watts to 6L6 and FB7 receiver. ALA, of Lakeside, is building superhet, as per latest *Handbook*. ALP is new in Montreal with a pair of 814s and 1155 receiver and works on 3.5 Mc. WK is back on 7 Mc. with 807 and S-40 after a long silence. Traffic: (Jan.) VE2GM

(*Continued on page 102*)

BOB HENRY, WØARA, OFFERS YOU:

LOW PRICES: I sell to you as cheap or cheaper than you can buy anywhere.

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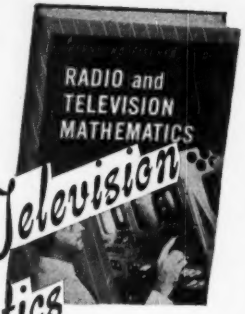

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126, LO 109, CD 69, EC 54, XR 41, AKJ 36, BG 7. (Dec. VE2GM 161, XR 65, BG 40, QN 25, AKJ 7, JN 4.

VANALTA DIVISION

ALBERTA — SCM, Sydney T. Jones, VE6MJ — BN is using parallel 807 in the new rig. JJ, ES, and TR are reported to be well on the road to recovery after recent illnesses. MJ installed n.f.m. in the rig and says most reports are good. LQ is recovering from a nasty fall which necessitated a slight operation. ZW is interested in 56-Mc. operation. IW and IX report in on the Alberta 'phone net occasionally. AO was a recent visitor to Edmonton during the drama festival. GD is Alberta's first WAZ. Nice going, Jim! HI is sporting a new receiver. MB's AEC group is shaping up very well. LI claims that the front porch is no place for the ham shack during the cold weather. DZ is operating 28-Mc. 'phone. BG has a new job with the local transportation system. RG, BG, and MJ are operators with the 418th Auxiliary Squadron, RCAF. KO has been appointed EC for the Lethbridge area. Give him all the support you can, gang. VJ was on the bit when an emergency existed in Lethbridge recently. TK reports 43 members in Calgary AEC. LZ is looking for the ultimate in frequency-measuring equipment. KC and PB have applied for ORS appointment. IK is new OBS. Traffic: VE6OD 53, MJ 48, BN 9.

BRITISH COLUMBIA — SCM, Ernest Savage, VE7FB — Our efforts at the Blind School were rewarded when Jimmie Nyman passed his examination; so, fellows, let's go with the new class. Doctor XU is very helpful to the fellows in the North Country. New calls in Nanaimo are DH, GP, and JI. Yes, it was the SCM on 28 Mc. OJ and AIH, of the Collingwood Club, have been seen muttering some sort of Spanish. Too much of that country, maybe. PY and AMY are laid up in bed and will be there for some time. XA, your RM, sends in a nice activity report. IF made 35-w.p.m. certificate on the first try. BQ, CN, and TQ are working on rigs for 400 Mc. LP reports in with 60 volts of a.c. LK reports that the power company there just pulls the big switch so far this cold weather and has brought only power failure and trains snowed in with no emergency traffic. However, messages reporting the welfare of families have been heavy. CN has his ankle out of the cast and is doing fine. XW and AOB are hard at it rebuilding their new dreams. SJ is back in the RCAF. AFO and VP are on single sideband. OQ is up in Penticton. The B.C. Net is looking for members and suggestions for a B.C. c.w. contest. See YI. ALJ transferred from Ashcroft to Abbotsford. AOQ reports DX good on 3.8 Mc. lately. AFM is talking 28 Mc. HE has been in Vancouver talking power increase. SW is too busy working to be heard often. AC, reëlected president of the BCARA, is finding time to rebuild. Traffic: VE7IF 173, AOQ 151, XA 127, FB 70, US 18, ID 6.

PRAIRIE DIVISION

MANITOBA — SCM, A. W. Morley, VE4AM — Our sincere sympathy to RO. Not many reports were received this month. LC has new 3.5-Mc. VFO. 5IM was in the Peg. 5CP now is located at The Pas as operator for an airline company. PA, at Dauphin, is heard on 3.8 Mc. New members of the 'phone net are GG and OO. GV is rebuilding. JN spent a week in Brandon. HS is new OPS. How about more of you fellows following Hal's lead and taking out an appointment. IA is QRT until the warmer weather as the shack is too cold. CE has the Collins 32RA going. BS and AX are in the hospital. A speedy recovery to you both. Eleven stations reported traffic this month; a new high. How about some dope from DG, EA, GW, and others? Traffic: (Jan.) VE4AM 157, FA 100, CE 37, HS 9, LF 9, FE 6, QD 5, CI 4, DJ 3, DQ 3, FS 1. (Dec.) VE4LF 16.

SASKATCHEWAN — SCM, J. H. Goodridge, VE5DW — The Saskatoon Club has decided to hold a hamfest in Saskatoon July 1st and 2nd. AW is building a new converter. There are 40 members in the Saskatchewan 'Phone Net. New net frequency is 3780 kc. Old Man Winter chased OB into the house with the rig. Best wishes to RJ for a quick recovery from his operation. On Jan. 6th the Saskatoon boys broke down and treated their YLs and XYLs to a turkey dinner and a social evening. HR ran up an FB score in the January CD Party. KR is running 15 watts on 28 Mc. and has worked all continents but Asia. WA, JT, and FJ are new calls in Moose Jaw. RR is hoping to make WAS with his 19 set. KJ is working DX on 7 Mc. Some of the gang have a coffee club on 3.8 Mc. each morning. DG took unto himself a bride. JB reports the birth of his third daughter. KI is heard from Willow Bunch. GX is heard on 3.8 Mc. JV has received his DXCC award. VB has 813 final now. DN is constructing a VFO. EK is looking for someone with whom to swap parts. UQ's truck received considerable damage when hit by a speeding automobile, while Bill had a narrow escape. Traffic: VE5HR 63, DW 2.

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Beginner's Transmitter

(Continued from page 19)

350-volt supply). Starting at a maximum capacitance, C_{13} should be adjusted carefully until the plate current dips to a minimum. This indicates resonance at the crystal frequency. A further decrease in condenser capacitance should reveal another slighter dip in plate current. This indicates resonance at the second harmonic or twice the crystal frequency. This setting should be avoided in operating the transmitter.

The 80-meter antenna-coil plug should now be connected up for either series or parallel tuning as indicated in the table. The link and coil center-tap wires should be disconnected from Pins 3 and 4. If series tuning is called for, Pin 3 should be strapped with a piece of wire to Pin 5. If parallel tuning is required, Pins 4 and 5 should be connected together and Pins 2 and 3 joined.

Now connect one of the feed-line wires to one transmitter output terminal. Connect the other feed-line wire to one terminal of a dial-lamp socket and the other dial-lamp terminal to the remaining output terminal, as indicated in Fig. 1. If series tuning is required, use a No. 41 (white bead) 2.5-volt 0.5-ampere lamp in the socket. If parallel tuning is specified, use a No. 48 (pink bead) lamp rated at 0.06 ampere.

Set C_{14} at minimum capacitance, close the key and retune the amplifier to resonance at 80 meters. The dip in plate current probably will not be so pronounced as it was before the antenna coil was plugged in. Then adjust C_{14} and watch the plate current. At some point in the range of C_{14}, the plate current should rise to a maximum. Adjust C_{14} to this maximum. At this point the lamp in the feed line should show an indication of output. If it doesn't show at least a glow when series tuning is used, try a lamp with a lower current rating, such as the No. 46 (blue bead) which has a rating of 0.25 ampere. If, on the other hand, the lamp burns out with parallel tuning, use a lamp with a higher current rating, such as the No. 40 (brown bead) rated at 0.15 ampere.

Now readjust C_{13} for maximum lamp brilliance. A slight further readjustment of C_{14} and then C_{13} may improve the output. At this point, detuning C_{13} in either direction should show at least a slight rise in plate current. If it doesn't, the coupling should be reduced by bending the adjustable link away from the antenna coil. Use the tightest coupling that will permit a discernible dip in plate current when C_{13} is tuned through resonance. When tuning is completed, the dial lamp may be shorted out with a clip lead.

Forty-meter output can also be obtained with an 80-meter crystal, simply by plugging in the 40-meter coils and following the same procedure. However, the output in this band will be greater if a 40-meter crystal is used. Be sure to note from the table if there is a change between series and parallel tuning in going from 80 to 40 meters and wire up the 40-meter antenna-coil plug and change the dial lamp accordingly, if required.

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414 429 444 479 495 507 518
415 431 445 481 496 508 519
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418 434 447 484 498 511 523
419 435 448 485 503 512
420 436 462 487 **49¢** each
422 437 468 488
423 438 472 490
424 440 473 491 each
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372 381 390 401
374 383 391 402
375 384 392 403
376 386 393 404
377 387 394 405
379 388 395 408
380 396 409
each 397 411
39¢ 400 each
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452.777 533.333
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464.815 537.500
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5030 6206 7840 7975
5485 6208 7873 8240
6006 6773 7906 8273
6040 6840 7925 8306
6073 6873
6075 6906 each
6100 6940
6106 6973 **49¢**
6140 7740
6150 7773 10 for $4.50

3735 5825 6373 6706 7506
5305 5840 6406 6740 7540
5675 5850 6425 6806 7573
5677 5873 6440 7306 7640
5700 5875 6450 7340 7673
5706 5900 6473 7373 7706
5725 5906 6475 7406 7806
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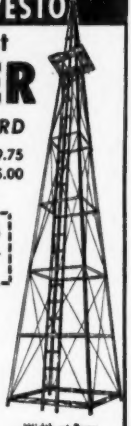

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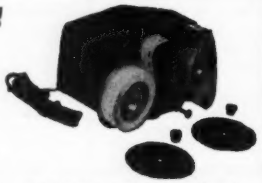

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Armed Forces Day

(*Continued from page 31*)

short-haul circuits which can be set up quickly, handle all local traffic and expedite the load by way of the nearest major circuit in operation. A relay contest will determine circuit characteristics which are not shown in a normal QSO party.

The contest will last 12 hours. It will begin at 1700 GCT May 20th and will end at 0500 GCT May 21st. Check the box on page 31 which shows the starting time in your local standard time. Don't forget to add an hour if your locality is on Daylight Saving Time.

The QSO form will be left to individual stations. However, contest officials urge that in the interests of promoting new and renewing old friendships, each QSO include RST, QTH and name.

Any amateur radio station licensed by the FCC or by the Armed Forces of the United States is eligible to compete in the Armed Forces Day Contest.

Rules

a) General calls will be used as follows: (1) *C.W.* — "CD AD"; (2) *'phone* — "CQ Armed Forces Day."

b) All amateur bands, either 'phone or c.w., can be used.

c) Single- and multi-operator stations will be considered separately for purposes of scoring the contest.

d) Operating and message procedures will conform to standard amateur practice.

e) All contest logs will be sent to Room 5 B 519, The Pentagon, Washington 25, D. C., postmarked before midnight May 30, 1950.

Scoring

	Points
a) Each QSO	1
b) Originating one message addressed to anyone other than the station called. (No station will receive credit for more than one originated message during the contest period.)	10
c) Receiving a message for relay or delivery	2
d) Transmitting (relaying) a message	2

e) A multiplier of 2 will be used for all points earned while using emergency power for transmitting and receiving. Emergency power is defined as any power supply other than that drawn from commercial facilities. *Note sample log.*

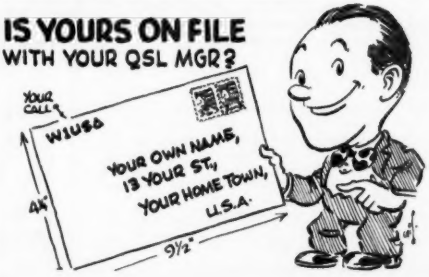
f) Working the same station on more than one band will not count. When a station is worked a second time, credit may be received for the message only.

—•••—

Contest log forms are available upon request. Write Armed Forces Day Contest, Room 5 B 519, The Pentagon, Washington 25, D. C.

Capt. E. L. Nielsen W4ODI, chief of MARS-Army, Comdr. E. L. Battey, W4IA, Naval Reserve liaison officer, Naval Communications, and Major R. H. Ralls, W4RB, chief of MARS-Air Force have been named to a committee to supervise and judge the contest.

IS YOURS ON FILE WITH YOUR QSL MGR?



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Browning Labs.
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Kester • Littlefuse
Masco • Mallory
McMurdo Silver
Millen • Mueller
Meissner • National
Ohmite • Par Metal
Premax • Pickering
Precision • RCA
Rider • Rek-O-Kut
Reeves • Racon
Simpson • Shure
Sylvania • Stancor
Supreme • Sangamo
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TWINSET*

MONOSET*

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The Twinset weighs only 1.6 ounces, the Monoset, 1.3 ounces.

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INSTRUCTOGRAPH COMPANY

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Results — 10-Meter WAS

(Continued from page 33)

W1ODW	1539- 57-27
W1LVQ	648- 36-18
W1NLM	646- 34-19
W1SEB	448- 32-14
W1QIS	405- 27-15
W1BUD	9- 3- 3

Maine

W1SIJ	1992- 83-24
W1ROM	944- 59-16
W1SNV	150- 15-10
W1NNX	144- 18- 8

Eastern Massachusetts

W1BOD	3224-104-31
W1NBI	1378- 53-26
W1GOU	1209- 39-31
W1AO	544- 34-16
W1KBN	480- 32-15
W1PWK	294- 21-14
W1RGY	104- 13- 8
W1QON	69- 9- 7
W1IQO	25- 5- 5
W1PYM	15- 5- 3
W1BB	1- 1- 1

Western Massachusetts

W1RIL	10,027-271-37
W1IJI	1401- 61-23
W1LLT	836- 38-22
W1PHU	207- 23- 9

New Hampshire

W1BFT	10,222-269-38
W1HRI	1944- 72-27
W1HOU	1600- 65-26
W1ET	1562- 71-22
W1JIY	912- 48-19

Rhode Island

W1CJH	7372-194-38
W1BFB	6060-202-30
W1HXS	2296- 82-28
W1AOP	940- 47-20
W1BBN	128- 16- 8

Vermont

W1FPS	2656- 83-32
W1QNM	2548- 91-28
W1AXN	663- 19-17

NORTHWESTERN DIVISION

Idaho

W7GWD	7110-237-30
W7FBD	3718-143-26

Montana

W7GBL	1725- 75-23

Oregon

W7JDX	7040-176-40
W7LPZ	4191-127-33
W7CUJ	3492- 97-36
W7LJJ	1104- 48-23

Washington

W7LEV	11,448-318-36
W7EYD	9143-223-41
W7MSI	5600-175-32
W7JTR	5587-151-37
W7NLI	4970-142-35
W7RT	3799-131-29
W7JIH	3690-123-30
W7MCT	2280- 76-30
W7DP	1224- 51-24
W7KEU	45- 9- 5

PACIFIC DIVISION

Hawaii

KH6IJ	16,450-350-47
KH6OH	644- 28-33
KH6RU	560- 35-16

Nevada

W7KIO	8748-243-36
W7MJB	1449- 69-21

Santa Clara Valley

W6CUB	4375-125-35
W6AMO	3420-114-30
W6YHB	1891- 61-31
W6CHR	1564- 68-23
W6SYW	153- 17- 9

East Bay

W6ZXD	6156-171-36
W6AJN	5846-158-37
W6IPH	4352-128-34
W6RRH	3875-125-31
W6VDG	3808-119-32
W6JOH	1173- 51-23
W6EJA	66- 11- 6

San Francisco

W6PSY	3861-117-33
W6BUR	3712-116-32
W6BAI	2704-104-26
W6SHL	1740- 58-30
W6EVI	72- 9- 8

Sacramento Valley

W6GDO	9250-250-37

San Joaquin Valley

W6VPV	9361-253-37
W6AJE	2660- 95-28
W6GRO	448- 28-16

ROANOKE DIVISION

North Carolina

W4OSP	5808-176-33
W4VW	2912-104-28
W4IZR	1476- 82-18
W4PRL	735- 49-15
W4FUF	300- 25-12

Virginia

W4DHZ	9906-254-39
W4HPC	6840-228-30
W4KFC	1856- 64-29
W4NQV	880- 55-16
W4JUY	128- 16- 8
W4IA	96- 12- 8
W4CVO	48- 8- 6

West Virginia

W8JM	226- 14- 9

ROCKY MOUNTAIN DIVISION

Colorado

WØULZ	3650-146-25
WØWLN	3220-140-23
WØAZT	1496- 88-17

SOUTHEASTERN DIVISION

Alabama

W4CYC	3840-128-30
W4OOO	234- 18-13

Eastern Florida

W4FNQ	6903-177-39
W4NKD	2775-111-25
W4OCG	2550-102-25
W4LZM	2520- 98-28
W4HKJ	4- 2- 2

(Continued on page 110)

Stop! WHY PAY MORE FOR MOBILE EQUIPMENT?

Take Advantage of Extra - Liberal Allowance on Your Used Communication Equipment in our . . .

GIGANTIC "Surprise" TRADE-IN EVENT

Your old (factory-built) Communication Equipment taken in trade for brand new Stancor, Harvey Wells or Lysco Mobile Units. EASY TERMS ON YOUR NEW EQUIPMENT PURCHASES.

What have you to trade? For astounding bargains, wire, write, phone or use the handy coupon below.

Stancor Model ST-203A
10 meter Mobile Transmitter.
Kit less tubes .....**Only** $44.70
Wired and tested, less tubes. **Only** $55.90
Shpg. Wt. 20 lbs.

Harvey Wells Model TBS-50 All Band Transmitter
Model TBS-50B—CW only, complete with tubes. **Only**.....**$87.50**
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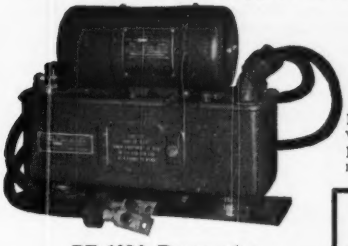
Shpg. Wt. 28 lbs.



PE-103A Dynamotor
For Mobile use with either of above transmitters. .....**Only** $9.95
(Sold Only With Above Transmitters)

T-17-B Shure Carbon Mike
Shpg. wt. ½ lb.....**Only** $1.25

FREE!
New 164 page catalog. The "Treasure" Chest" of values! Send for your copy today!

Gon-Set Converters
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10-11 Meter Gon-Set Converter
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Shpg. Wt. 4½ lbs. **Only $39.93 ea.**
Gon-Set Noise clipper for above
Shpg. Wt. ½ lbs. **Only $8.25**

Lysco Mobile VFO
Model 381. **Only** $21.95
Model 381R with 15 ft. coax cable for remote mntg **Only** $27.95

MASTER MOBILE MOUNT ANTENNA
All band center loaded mobile antenna. 10-20-40-75 meter operation. Complete with coil for one band (specify), but less mtg. base. **Only**.... $7.79
Extra coils **Only $2.89 ea.**
(Note: 10 meter operation does not require center coils.)

Master Mobile Mount Universal Body Mount (Swivel Type) complete. **Only** $7.79

Master Mobile Mount Stainless Steel 96" straight whip Model 100-96S. **Only** $4.67

Lysco Mobile Transmitter
Model 129 10-11 MTRS **ONLY** $23.95
Model 175 75 MTRS
each less tubes and power supply.

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for .....
(show make and model of new equipment desired)
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CITY ..... ZONE ... STATE .....

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For Overseas Assignments

Technical Qualifications:

1. At least 3 years' practical experience in installation and maintenance.
2. Navy veterans ETM 1/c or higher.
3. Army veterans TECH/SGT or higher.

Personal Qualifications:

1. Age, over 22—must pass physical examination.
2. Ability to assume responsibility.
3. Must stand thorough character investigation.
4. Willing to go overseas for 1 year.

Base pay, bonus, living allowance, vacation add up to $7,000.00 per year. Permanent connection with company possible.

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Men qualified in RADAR, COMMUNICATIONS or SONAR give complete history. Interview will be arranged for successful applicants.

CODE SENDING RECEIVING SPEED

HAVE SKILL, ACCURACY

SEND and RECEIVE CODE this EASY — FASTER WAY! The CANDLER SYSTEM has developed expert Amateur and Commercial Operators, and Code Speed Champions. In a few weeks you can pass the code examination for license. You can send and receive with amazing skill and speed, without tension. Long hours of practice unnecessary to acquire proficiency. The WAY YOU LEARN is ALL IMPORTANT! By simple progressive lessons Candler teaches you at home to send and receive as easily as you talk or read — FAST, ACCURATELY. **SEND Now For FREE BOOK** — explains how fine amateurs and radiotelegraph experts learned code and developed skill and speed.

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Georgia

W4OLO	207- 23- 9
W4EV	48- 8- 6

West Indies

KP4JE	1636- 64-24

SOUTHWESTERN DIVISION

Los Angeles

W6HGA	6696-191-36
W6TYV	6640-166-40
W6FGS	6520-163-40
W6VAQ	3828-116-33
W6HGH	3468-102-34
W6LVQ	2480- 80-31
W6DFO	2040- 68-30
K6BF	1210- 55-22
W6HCW	1170- 65-18

Arizona

W7KZS	8505-243-35
W7MOW	6230-178-35
W7NMD	3472-124-28
W7JUT	2450- 98-25

San Diego

W6APG	12,062-326-37
W6MI	8435-241-35
W6GTM	5957-161-37

WEST GULF DIVISION

Northern Texas

W5AWT	3888-162-24
W5IGU	1785- 85-21
W5OLG	845- 65-13
W5FWA	629- 37-17

Oklahoma

W5JME	4047-213-19
W5LRY	2450- 98-25
W5QWI	350- 25-14

Southern Texas

W5NQI	8122-262-31
W5NPA	5768-206-28
W5IX	5022-186-27
W5FI	3375-125-27
W4PLS/5	2574-117-22
W5MLV	1134- 54-21

New Mexico

W5DWB	3025-121-25
W5NXF	2750-125-22
W5CA [1]	828- 46-18
W5PVM	325- 25-13

CANADA

Maritime

VE1CU	144- 12-12

Ontario

VE3QE	3562-137-26
VE3BTE	1035- 69-15

Quebec

VE2NA	456- 38-12

British Columbia

VE7EH	3192-114-28
VE7WL	336- 24-14

Saskatchewan

VE5PK	3250-130-25
VE5QZ	5760-192-30

Happenings

(*Continued from page 38*)

ager Fred Schnell, 1MO, left on a world-wide cruise with the Navy to demonstrate the value of the short waves, OM Handy was called to Hartford to take over the administration of the Communications Department and its field organization, a post he has held ever since. The amateur body, and particularly those primarily interested in organized operating activities, will certainly join in extending warm 73 to "FEH" and good wishes for the next 25 years.

Sweepstakes Results

(*Continued from page 41*)

Maine

W1NXX	76,555- 502-61-A-40
W1GKJ	75,900- 550-69-B-40
W1DEO	60,847- 430-71-B-38
W1LSK	30,720- 240-64-B-34
W1NGV	7134- 123-29-B-12

E. Massachusetts

W1AWX	103,275- 608-68-A-40
W1IAP	75,320- 540-70-B-40
W1BOD	74,520- 435-69-A-40
W1AQE	63,440- 488-65-B-39
W1HVR	49,228- 340-58-A-38
W1QMJ	47,082- 400-59-B-34
W1PEG	41,706- 333-63-B—
W1MX[2]	31,920- 285-56-B-39
W1QZS	26,325- 235-45-A-31
W1LML	22,540- 161-56-A-27
W1NS	18,720- 156-60-B-21
W1NW	18,414- 173-54-B-22
W1PH	17,500- 200-35-A-21
W1AO	16,300- 163-50-B-20
W1RXB	11,625- 156-30-A-25
W1OMI	9594- 123-39-B- 8
W1PLJ	6825- 78-35-A-20
W1RSR	6565- 101-26-A-15
W1KMY	4350- 60-29-A- 7
W1LNT	4140- 70-24-A-22
W1JYC	3640- 56-26-A- 9
W1QFO	2083- 49-17-A-10
W1BDF	2080- 40-26-B- 7
W1LQQ	1360- 34-16-A- 3
W1JCE	1296- 31-17-A- 4
W1IUY	744- 31-12-B- 7
W1EMG	275- 11-10-A- 1

W. Massachusetts

W1JYH	117,150- 660-71-A-33
W1EOB	93,365- 527-71-A-32
W1IJT	46,831- 320-59-A-32

(*Continued on page 112*)

[1] Operated by W2WRZ.

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"The Home of RADIO"

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Made by a well known manufacturer. All brand new and in perfect condition. They accepted our offer, so you "get a break," savings of practically 50%. So hurry your order. They may not last long.

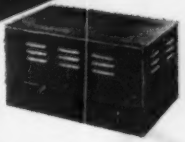
AMPLIFIER FOUNDATIONS AND CABINET RACKS

AMPLIFIER FOUNDATIONS

Deluxe models louvres on 4 sides and elongated holes on top for maximum ventilation. Rounded corners Black Wrinkle Chassis. Grey Wrinkle covers.

MODEL	SIZE	SPECIAL PRICE
5103	5x10x13	$1.74
6143	6x14x3	$1.98
7173	7x17x3	$2.43
10123	10x12x3	$2.52
10173	10x17x3	$2.93

We carry a complete line of Steel Bottom Plates.



CABINET RACKS

Made of 1/16" electrically welded steel, louvres on sides, ventilation in back. Flush panel mounting for 19" rack panels. Door on top with snaplock and piano hinges. Finished in Black Wrinkle.

MODEL

108 Panel Size 8¾"x19". Size of Cabinet 10½"x21½"x15". Single Unit ..... $ 8.33

1412 Panel Size 12¼"x19". Size of Cabinet 14"x21½"x15". Single Unit $10.13

1917 Panel Size 17½"x19". Size of Cabinet 19⅛"x21½"x15". Double Unit-Door Top and Back $13.87

2826 Panel Size 26¼"x19". Size of Cabinet 28"x21½"x15". Triple Unit-Door Top and Back $15.66

TRANSFORMER SPECIAL

870 volt CT @250Ma with 80V bias tap
5 volts @ 3 amps
2½ volts CT @ 10 amps
2½ volts @ 3 amps
6.3 volts @ 1.5 amps
115V. 60 cycle primary

$3.95

MERIT TV COMPONENT REPLACEMENTS

DEFLECTION YOKES

MD-1 for tubes requiring 50° deflection in place of RCA #201D1 ..... $4.44

MD-3 same as above in place of RCA #201D3 ..... $4.44

MD-12 for tubes requiring 53° deflection in place of RCA #201D12 ..... $4.44

MD-70 for wide angle tubes requiring 70° deflection $4.44

FOCUS COILS

MF-1 for tubes up to 10M V. —247 ohms. resistance in place of RCA 202D1 .... $4.44

MF-3 same as above except 360 ohms $4.44

MF-2 for tubes up to 14 M V. 470 ohms. D.C. current, 140Ma. maximum in place of RCA 201D12 $6.52

FLYBACKS

HVO-1 for RCA 211T1. Provides up to 10M anode volts for 7 or 10BP4. $4.15

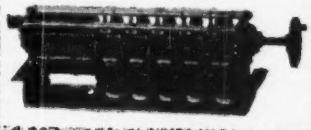
HVO-3 for RCA 211T3. Provides approximately 9M anode volts for 10" & 12" tubes $4.15

HVO-5 for RCA 211T5. Provides approximately 14M anode volts for #16AP4 or similar tubes $5.33

HVO-6 for G.E. 77J1. Provides up to 14M anode volts for any tube to 19" .. $5.92

VARIABLE CONDENSER

6 Gang; 1 section of .00025 Mfd, 4 sections .000035 Mfd, 1 section of .00005 Mfd; with 5 air trimmers of 15 to 25 Mmfd capacity. Silver Plated. Each only **95c**



TUBES

3C24 Triode 100 Watts output: 6.3 Volts 3 amp. Filaments 2000 Volts plate @ 75 Ma. Each 39¢. 10 for .....

$3.50

2 x 2/879 Rectifier 2.5 Volts 1.5 amp. .... 49¢

RELAYS

G.E., 2500 Ohm, 4 Ma. SPDT, 5-prong plug in type, hermetically sealed. Brand New.

95¢

SCOPE & TELEVISION TRANSFORMERS & CHOKES

2500V. RMS @ 5 Ma D.C.—6.3V. @ 3 amps tapped at 2.5V. @ 3 amps; 2.5V. @ 2 amps; Type P-3171 ..... $6.76

1700V. RMS @ 2 Ma D.C.—6.3V. @ 9 amps tapped at 2.5V. @ 2 amps; 2.5V. @ 2 amps; Type P-3170 ..... $5.14

2 Hys @ 250 Ma D.C. type C-2991 ..... $1.62

2 Hys @ 200 Ma D.C. type C-2974 ..... $1.92

VERTICAL BLOCKING OSC. turns ratio pri. to sec. 1:4.2
Unshielded type A-3000 ..... $1.18
Shielded type A-4000 ..... 1.62

HORIZONTAL BLOCKING OSC. turns ratio pri. to sec. 2:1
Unshielded type A-3002 ..... $1.32
Shielded type A-4002 ..... 1.76

VERTICAL OUTPUT turns ratio pri. to sec. 10:1
Unshielded type A-3035 ..... $3.09

ALUMINUM CHASSIS

7x5x2	18 gauge	$0.82
7x7x2	18 gauge	$0.92
9x7x2	18 gauge	$1.03
5x10x3	18 gauge	$1.12
7x11x2	18 gauge	$1.06
12x10x3	18 gauge	$1.62
10x14x3	16 gauge	$2.26
15x7x3	16 gauge	$1.76
17x10x3	16 gauge	$2.20
17x13x3	14 gauge	$2.82
17x13x5	14 gauge	$3.67

We carry a complete stock of steel & Aluminum Chassis & Panels.

Complete line of Shure Microphones in Stock.

POWERSTAT VARIABLE TRANSFORMERS

Type 20: 115 V. input, O-135 V. output @ 3.0 amps. 0.4 KVA $12.50

Type 116: mounted; 115 V. input, O-135 V. output @ 7.5 amps. 1.0 KVA $23.00

Type 116U: unmounted; 115 V. input, O-135 V. output @ 7.5 amps. 1.0 KVA $19.00

Type 1126: 115 V. input, O-135 V. output @ 15.0 amps. 2.0 KVA $46.00

Type 1226: 230 V. input, tapped at 115 V. O-270 V. output @ 9.0 amps. 2.4 KVA $46.00

Type 1156: 115 V. input, O-135 V. output @ 45.0 amps. 6.1 KVA $118.00

ISOLATION TRANSFORMERS

All 117 Volts to 117 Volts 60 Cy.

P-96, 40 watts $3.60 P-98, 100 watts $9.30
P-97, 80 watts $5.10 P-99, 250 watts $17.70

MODEL 737A X-TAL

Frequency response 60 to 10,000 CPS. Output level —53 DB. Can be pointed toward desired sound or upwards for non-directional horizontal plane pickup. Metal Seal X-Tal for long life. Built in cable connector. With 20' cable **$23.37**

MODEL 51 DYNAMIC

Output—52 DB beiqw 1 volt per bar. Frequency range 60 to 10,000 CPS. Impedance same as Model 55. With 20' two conductor shielded cable .. **$23.37**

If not rated 25% with order, balance C. O. D. All prices F. O. B. our warehouse New York. No order under $2.00
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Continuous Tuning Final Tank
Front Panel Controls
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VFO Input Receptacle
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All Stages Metered
Desk Cabinet 11-3/16"x15"x21"

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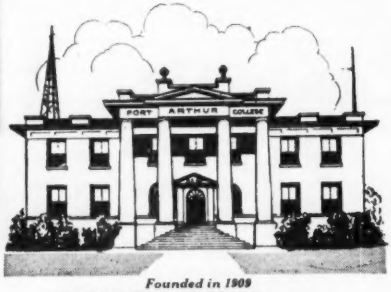

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Courses ranging in length from 7 to 12 months. Dormitory room and board on campus for $40.00 a month. The college owns KPAC, 5 KW broadcast station with studios located on campus. New students accepted monthly. If interested in radio training necessary to pass F.C.C. examinations for first-class telephone and second-class telegraph licenses, write for details.

PORT ARTHUR COLLEGE PORT ARTHUR TEXAS
Approved for G. I. training

W1MVF	46,423-	300-62-A-31
W1RBK	39,684-	300-53-A-30
W1RHU	30,713-	275-45-A-23
W1KJO/1	25,685-	234-44-A-18
W1BVR	13,743-	120-46-A-11
W1AVK	13,000-	125-52-B-23
W1BEF	12,496-	142-44-B-17
W1RZG	12,040-	173-28-A-16
W1AZW	11,360-	142-32-A-12
W1ASU	7708-	84-47-B-11
W1DGT	7400-	80-37-A-12
W1RIA	5039-	74-29-A-16
W1OPJ	3536-	63-23-A- 7
W1RCS	1740-	44-16-A- 4
W1BDV	1530-	34-18-A- 4
W1SIT	536-	22-11-A-17

New Hampshire

W1CRW	80,000-	500-64-A-29
W1QYZ	41,738-	315-53-A-33
W1CVK	3315-	51-26-A- 8
W1QJY	455-	19-13-B—
W1KYG	50-	5- 5-B- 1

Rhode Island

W1CJH	102,960-	574-72-A-38
W1BBN	27,475-	157-70-A-25
W1RFQ	26,284-	247-43-A-34
W1QOG	18,038-	185-39-A-16
W1AWE	10,086-	123-41-B—
W1MJL	7600-	95-32-A—

Vermont

W1KRV	52,038-	414-63-B-30

NORTHWESTERN DIVISION

Alaska

KL7SQ	25,498-	170-62-A-30
KL7PB	12,096-	127-48-B-13

Idaho

W7FBD	46,069-	293-63-A-22
W7MOU	42,240-	340-64-B-32
W7GHT	27,626-	209-53-A-21
W7MHR	14,535-	171-34-A-30
W7IY	12,338-	120-42-A-40

Montana

W7FLB	31,558-	259-62-B-25
W7KGJ	31,005-	234-53-A-39
W7EWR	29,353-	201-59-A-17
W7MHQ	25,531-	240-43-A-26
W7MJI	19,950-	145-57-A-13
W7LER	8280-	92-36-A-24
W7JFR	7483-	74-41-A-18
W7NRJ	5468-	81-27-A-13
W7COH	792-	22-18-B- 7

Oregon

W7HKT	103,032-	723-70-B-38
W7IRI	60,180-	445-68-B-40
W7CYT	42,598-	364-59-B-39
W7JCU	30,686-	230-67-B-37
W7LNG	30,426-	202-61-A-32
W7BOH	16,530-	114-58-A-16
W7LT	16,485-	158-42-A-40
W7LZI	1663-	35-19-A-12
W7IRZ	180-	9- 8-A- 1
W7HLF	120-	10- 6-B—
W7JAZ	41-	6- 3-A- 4

Washington

W7GBW	103,589-	743-71-B-40
W7NLI	91,263-	523-70-A-37
W7KWC	84,525-	490-69-A-38
W7GUV	83,768-	460-73-A-35
W7LEV	73,198-	441-67-A-38
W7JJK	62,560-	369-68-A-38
W7KIH	58,872-	449-66-B-38
W7JC	35,150-	241-60-A-35
W7EAU	28,885-	218-53-A—
W7UMI	25,374-	193-53-A-33
W7FIM	15,730-	122-52-A-19
W7ZQX	9343-	102-37-A-15
W7LCS	963-	28-14-A- 8
W7ESV	935-	22-17-A- 8
W7KIL	504-	18-14-B- 1
W7MCU	338-	15- 9-A- 2
W7NKM	10-	2- 2-A- 6

PACIFIC DIVISION

Hawaii

KH6IJ	62,964-	477-66-B-32
KH6AAD	33,525-	224-60-A-38
KH6VP	16,950-	113-60-A-10

Nevada

W7KEV	146,160-	813-72-A-40
W7ZT	72,995-	562-65-B-40
W7MZP	19,146-	145-53-A-22
W7KWZ	15,070-	139-44-A-15

Santa Clara Valley

W6UTV	95,760-	665-72-B-40
W6YHM	92,125-	551-67-A-40
W6KJG	43,032-	327-66-B-24
W6HOC	35,460-	197-72-A-40
W6WUJ	32,062-	225-57-A-21
W6MMG	13,530-	123-44-A-15
W6LVQ	1846-	36-26-B- 6

East Bay

W6MVQ	131,400-	730-72-A-40
W6MHB	64,944-	451-72-B-40
W6NGC	58,793-	352-67-A-39
W6IPH	48,856-	394-62-B-29
W6MFZ	37,088-	215-69-A-16
W6ZHP	34,650-	221-63-A-39
W6WII	24,920-	223-56-B-21
W6VDR	18,938-	154-50-A-23
W6KEK	10,032-	114-44-B- 6
KV4AF/6	6160-	112-22-A-18
W6UDG	5148-	99-26-B-14
W6HHX	3023-	47-26-A-11
W6EY	2625-	42-25-A- 5
W6EJA	2500-	40-25-A- 5

San Francisco

W6BIP	68,256-	474-72-B-40
W6ATO	57,664-	426-68-B-37
W6EYY	54,925-	340-65-A-28
W6MLD	30,653-	201-61-A-34
W6YC	26,160-	167-64-A-27
W6WBU	15,016-	148-41-A-27
W6II	9720-	122-32-A-21
W6NBD	5125-	82-25-A- 8
W6HJI	853-	33-11-A- 9
W6CXO	192-	16-12-B—

Sacramento Valley

W6DBP	33,330-	253-66-B-19
W6MYT	19,478-	147-53-A-30
W6WTL	198-	11- 9-B- 2

San Joaquin Valley

W6SRU	103,500-	577-72-A-40
W6BVM	51,191-	361-71-B-22
W6QXF	13,250-	100-53-A—
W6EGX	13,100-	131-40-A-27
W6GUR	6240-	78-32-A-14
W6HJQ	3594-	58-25-A-23
W6BHI	1610-	28-23-A- 2
W6FIP	910-	28-13-A- 5

ROANOKE DIVISION

North Carolina

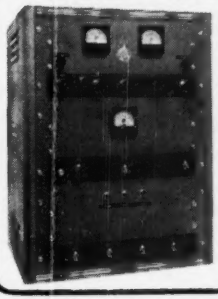
W4AKC	89,200-	561-64-A-40
W4OPG	58,240-	416-70-B-30

(Continued on page 114)

SEE LEO FIRST . . .
QUIT WORRYING ABOUT TVI—
GET A WRL TRANSMITTER . . .

Tests with amateurs living in congested and fringe areas using WRL transmitters have proven to us that we have a XMTR with minimum television interference. Write today for detailed information!

NEW WRL "400"
GLOBE KING
"More Watts Per Dollar"



A versatile, advance design transmitter that gives efficient performance on all bands—10 to 160 on phone and CW. 350 watt phone—400 watt CW. Provisions for ECO. Complete-with one set of coils.

KIT FORM $379.45 **WIRED-TESTED $399.45**

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WRL 175 WATT GLOBE CHAMPION

R.F. Section a complete 175 watt XMTR. Provisions for ECO. Automatic fixed bias on Final and Buffer. Class B Speech Modulator 175 watt input — 10 thru 160 meter bands. Complete with tubes, meters, and 1 set of coils.

Low Down Payments

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Write For Detailed Specification Sheet

LEO I. MEYERSON WØGFQ

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Just right for your control room walls. Approximately 28" X 36". Contains time zones, amateur zones, monitoring stations. Mail coupon today and **25c**

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- ☐ New Catalog
- ☐ List of Used Equipment
- ☐ Globe King Info
- ☐ Globe Champion Info

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Address_____

City_____ State_____

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10-11 METER
$36.40
$6.00 EXTRA FOR FOLDED DIPOLE

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HY-LITE Antennac INC.
Yagi Antennas for AMATEUR · FM · TELEVISION
1060 WASHINGTON AVE., BRONX 56, N. Y.

The EKCO Solder Pencil

Ideal for miniature and sub-miniature equipment, model making, instrument repairs etc. Light, efficient, robust, reliable. Perfect control without fatigue — precision soldering in the most awkward places without risk of damage — operates from car battery, accumulator or mains transformer. Only $3.00 complete post free! If ordered at same time, spare bits 20c. Spare element wire (for 3 elements) 20c. Payment — banker's check on Wall Street correspondent. Mail coupon with check attached to E. K. Cole Ltd., Export Dept., 5 Vigo Street, London, W.1, England.

- weight complete 2½ oz.
- length 7 ins.
- diameter ⅜ ins.
- solder heat in 50 secs.
- 6, 12 or 24 volts
- consumption 10 watts

$3.00 POST FREE

PENCIL POINT PRECISION for small soldering jobs

Please write clearly

NAME.....

ADDRESS .....

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SEND . . . Ekco Solder Pencils . . . volt (6, 12 or 24) @ $3.00 each; . . . spare Bits @ 20c. each; . . . spare cards Element Wire @ 20c. each. Total value $ ..... Check attached.

To: E. K. COLE Ltd., Export Dept., 5 Vigo St., London, W.1, England

W4JPZ	10,325-	125-35-A-12
W4PRL	9208-	135-29-A-26
W4OXB	1365-	27-21-A- 7
W4OZY	1350-	27-20-A- 1

South Carolina

W4LJJ	24,150-	230-42-A-23
W4FNS	13,000-	125-52-B—

Virginia

W4KFC	181,849-	1026-71-A-40
W4KFT	133,170-	772-69-A-40
W4NNN	121,440-	705-69-A-40
W4IA	118,038-	676-70-A-40
W4KVM	92,813-	563-66-A-33
W4RQR	92,565-	563-66-A-37
W4CC	86,250-	500-69-A-29
W4FF	77,752-	479-65-A-35
W4NJV	72,100-	412-70-A-33
W4LUE	68,960-	431-64-A-25
W4JUY	64,431-	423-61-A-30
W4PYN	61,153-	401-61-A-40
W4KZQ	55,040-	344-64-A-32
W4WI	51,100-	365-56-A-19
W4BLE	50,490-	306-66-A-30
W4VE	50,490-	612-66-A-20
W4LRI	48,331-	352-55-A-19
W4LAP	47,850-	348-55-A-20
W4PNK	45,445-	298-61-A-36
W4OZN	45,370-	349-52-A-27
W4EMJ	33,875-	272-50-A-28
W4KYD	33,540-	260-52-A-20
W4GKY	32,450-	295-44-A-33
W4NQV	29,280-	248-48-A-21
W4NND	27,936-	266-42-A-29
W4CJS	25,125-	201-50-A-21
W4NH	20,020-	182-44-A-20
W4LUV	12,470-	172-29-A-16
W4PED	9065-	100-37-A- 9
W4JFE	5250-	70-30-A—
W4LOI[4]	272-	17- 8-B—

West Virginia

W8UMR	50,250-	335-60-A-33
W8DJQ	1943-	37-21-A-10

ROCKY MOUNTAIN DIVISION

Colorado

WØIC	54,940-	410-67-B-21
WØSJT	40,320-	253-64-A-37
WØJMB	26,413-	219-61-B-33
WØANW/Ø	13,970-	127-44-A-18
WØSGG	10,945-	100-44-A-11
WØTW	9625-	88-44-A-12
WØFZI	8400-	80-42-A- 9
WØKHQ	3806-	52-35-A-15

Utah

W7PJS	71,750-	412-70-A-37
W7UTM	14,795-	135-44-A-18
W7BSE	1623-	30-22-A- 9

Wyoming

W7OWZ	65,205-	383-69-A-38
W7HRM	55,744-	416-67-B-30

SOUTHEASTERN DIVISION

Alabama

W4GJW	46,725-	312-60-A-31
W4MXU	38,719-	264-59-A-22
WØGKW/4	27,810-	206-54-A-20

Eastern Florida

W4BRB	104,673-	761-69-B-40
W4FPK	101,104-	712-71-B-40
W4GOG	98,193-	694-71-B-40
W4MDV	39,758-	280-57-A-25
W4TH	30,008-	242-62-B-36
W4COB	23,142-	205-57-B-22
W4OGI	7000-	89-32-A-22
W4NWO	3335-	58-23-A- 9
W4MVJ	468-	17-11-A- 1
W4POF	250-	10-10-A- 3
W4IKU	230-	12- 8-A- 3

W. Florida

W4TL	28,248-	215-66-B-25
W4DBI	24,592-	214-58-B-23
W4HIZ	11,832-	116-51-B-19
W4QGH	1652-	30-28-B- 4

Georgia

W4MCM	56,085-	357-65-B-34
W4KSZ	37,275-	249-60-A-24
W4GGD	27,328-	224-61-B-21
W4VX	7215-	94-39-B—

West Indies

KP4KA	106,776-	743-72-B-38
CM2SW	34,272-	252-68-B-21
KP4IQ	20,802-	159-53-A-17
KP4JE	3713-	55-27-A- 3

Canal Zone

KZ5WZ	60,401-	388-63-A-25
KZ5DB	4263-	55-31-A-13

SOUTHWESTERN DIVISION

Los Angeles

W6WIP	164,430-	915-72-A-28
W6KRI	128,599-	725-71-A-32
W6MUO	87,975-	520-68-A-38
W6TIP	81,988-	471-70-A-39
W6WIR	60,030-	348-69-A-26
W6TDO	52,763-	315-67-A-33
W6CUF	46,328-	322-58-A-39
W6YLZ	23,085-	162-57-A-15
W6JQX	21,995-	166-53-A-20
W6BJU	21,830-	185-59-B-24
W6HJ	20,640-	172-60-B-16
W6JQB	17,184-	179-48-B-15
W6UYW	13,624-	131-52-B-20
W6WEG	12,155-	94-52-A-12
W6SRT	10,725-	130-33-A-24
W6GEB	10,106-	118-35-A-20
W6FZC	8865-	99-45-B-23
W6OEO	5088-	59-37-A-15
W6ZOL	3048-	53-23-A- 8
W6UPL	2610-	44-30-B-14
W6UQQ	1302-	31-21-B—
W6IOX	1232-	28-22-B- 4
W6ZVD	938-	38-10-A-12
W6QAE	850-	20-17-A- 6

Arizona

W7QAP	124,290-	693-72-A-40
W7MLL	22,148-	226-49-B-25
W7MGP	242-	11-11-B- 1

San Diego

W6EPZ	131,750-	732-72-A-37
W6MI	73,325-	420-70-A-40
W6YYN	63,650-	381-67-A-40
W6GTM	43,750-	250-70-A-28
W6NEC	28,560-	258-56-B-29
W6CAE	9702-	99-49-B-16
W6BYC	420-	14-12-A- 2

WEST GULF DIVISION

Northern Texas

W5BLU	109,550-	627-70-A-39
W5JD	66,585-	386-69-A-34
W5GDH	35,280-	280-63-B-25
W5DLM	29,131-	201-59-A-25

(*Continued on page 116*)

[4] Operated by W4OJA.

HOT NEWS

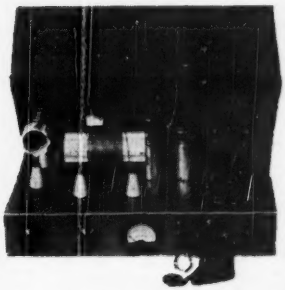
FROM THE HAM KIT HEADQUARTERS

ELDICO ADDS 2 NEW KITS

TO THEIR FAST GROWING SENSATIONAL LINE OF HAM KITS

No. 1—TR-75-TV

A 75-WATT TVI'd RIG

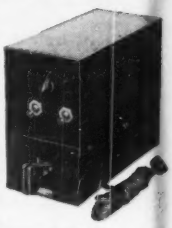


TR-75TV • Basically this is the same top-value kit as the sturdy dependable TR-75. To it has been added all of Eldico's working tools to eliminate television interference. In addition to all of the components, the TR-75TV includes integral low-pass filters; pi-network output tuner for additional harmonic attenuation; fully shielded 807 grid circuit; 3" square meter; fully shielded cabinet. **$44.95** *complete.*

THE STANDARD TR-75, less TVI components.....**$34.95**

No. 2—EE1

A REALLY FINE ELECTRONIC BUG

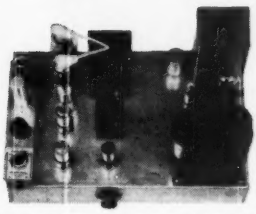


Now Eldico electronic bugs! Eldico introduces an electronic bug incorporating every improvement known to the art. Proven designs . . . worked over by Eldico engineers . . . analyzed in the light of *QST*'s January 1950 article "Debugging the Electronic Bug," Eldico offers two basic models, one with a built-in monitor.

Each key comes complete with all components, including a deluxe key assembly and a modern housing for the entire unit. Among the electrical features are self-forming dashes that automatically insure perfectly formed dashes; separate controls for speed and weight of characters; oversize components rated for heavy-duty continuous service.

EE1. Electronic Bug in kit form.....**$21.95**
EE2. Electronic Bug Kit including integral monitor.....**29.95**
EE3. Model EE1 completely assembled and tested.....**27.95**
EE4. Model EE2 completely assembled and tested.....**39.95**

The complete Eldico line of TVI FILTERS, TRANSMITTERS, and POWER SUPPLIES is available from top National Distributors throughout the United States. If your Distributor cannot supply you with Eldico kits write Eldico directly. WRITE NOW FOR YOUR FREE TVI BOOK. "TVI CAN BE CURED."



ELDICO MODULATOR KITS

100 WATTS — 40 WATTS

Eldico makes two Modulators for the Ham, in Kit form, the MD-100 and the MD-40 (which also comes with a power supply MD-40P). In keeping with the fine, high quality design of all Eldico Kits, these Modulators come complete ready to assemble and put to work. Both units are designed to accommodate the Electro-Voice Speech Clipper and the MD-40 series includes the Electro-Voice 915 high level crystal Mike.

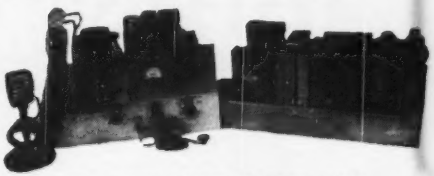
MD-100 • Complete Kit.....**$44.95**
MD-40 • Complete Kit and mike.....**29.95**
MD-40P • Complete Kit with power supply and mike.....**39.95**
SPEECH CLIPPER.....**14.70**

ELDICO GRID DIP OSCILLATOR

The "Grid-Dipper" is a really hot test unit in the shack. Save countless hours of building time, know your circuits are right. Complete with all parts and internal power supply. Range 3 MC to 250 MC covered in six steps. 5⅛" x 2¾" x 3".....**$21.50**

Modification Kit, including instruction to convert to regeneration type.....**$3.00**

NOTE: All prices F.O.B., New York City and are subject to change without notice.



TR-1 TRANSMITTER KIT

A conservative 300-Watt phone and c.w. rig 6V6-6V6-6L6-813, Class B 811 modulators. All bands, 80, 40, 20, 15, 11, and 10. Exciter broad band, single control PA tuning. Three power supplies delivering 1500 vdc at 350 ma, 500 vdc at 200 ma, and bias supply. Aluminum chassis, tubes, transformers, capacitors, resistors, antenna changeover relay, meter, wire, hardware and coils included. Electro-Voice 915 high level crystal microphone part of the package. Plug in the crystal and line cord and you're on the air. Only **$179.50** cash or **$89.50** down payment plus six monthly payments of **$15.75.**

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INCORPORATED
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DOUGLASTON L I NEW YORK

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Center Loaded Whip Antennas

For Your Mobile or Marine Installation

On 2 to 8 Mc.

A "must" for efficient operation on all frequencies between 2 and 8 Mc. The basic 75-meter Center-Loaded Antenna covers the entire mobile phone band. Other coils available for the marine 2000 to 3000 Kc., airport 3105 Kc., CAP 2374 Kc. and PS frequencies. Send for special Bulletin.

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W5PXT[5]	3870-	65-30-B-	6
W5AWT	3434-	52-34-B-	7
W5QIF	3-	1- 1-A-	1
Oklahoma			
W5LW[5]	86,400-	600-72-B-	37
K5NRJ	38,400-	300-64-B-	23
W5OWG	27,000-	253-54-B-	19
W5CKT	26,880-	240-56-B-	17
W5PZW	15,910-	153-43-A—	
Southern Texas			
W5GEL	102,612-	761-68-B-	36
W5FNA	85,560-	496-69-A-	39
W5NQI	70,263-	406-70-A-	40
W5QLP	52,000-	407-65-B-	26
W5NWQ	44,873-	301-62-A-	25
W5LOT	39,060-	250-63-A-	27
W5AQE	38,613-	321-61-B-	33
W5CXS	32,550-	222-60-A—	
W5EUK	15,810-	126-51-A-	36
W5LGG	7400-	80-37-A-	5
W5PNM	6383-	69-37-A-	11
New Mexico			
W5PES	100,888-	578-70-A-	39
W5POD	85,560-	496-69-A-	26
W5FVO	62,985-	376-68-A-	33
W5PVM	51,266-	334-63-A-	38
W5CA	29,295-	191-62-A-	11
W5PXN	29,013-	220-55-A-	30
W5PGH	27,569-	203-55-A-	20
W5NJR	16,965-	133-52-A-	21
W5SA	10,043-	104-39-A-	12
W5OCK	10-	2- 2-A-	1

CANADA

Maritime			
VE1AR	68,325-	555-62-B-	36
VE1TR	59,800-	370-65-A-	38
VE1IM	37,650-	252-60-A-	31
VE1CU	36,828-	280-66-B-	34
VE1KJ	22,440-	176-51-A-	22
VE1CM	13,800-	276-40-A-	26
VE1DB	12,144-	133-46-B-	19
VE1OM	8370-	93-36-A-	12
VO6EP	352-	16-11-B-	1
Ontario			
VE3KE	112,350-	644-70-A-	40
VE3WY	64,890-	412-63-A-	40
VE3ACB	54,270-	325-67-A-	30
VE3VX[6]	53,928-	436-63-B-	37
VE3BL	48,495-	319-61-A-	39
VE3MI	47,520-	352-54-A-	38
VE3AIL	46,168-	313-59-A-	35
VE3AMK	45,360-	364-63-B-	40
VE3BUR	34,260-	286-48-A-	22
VE3EAM	32,768-	257-51-A-	38
VE3ASD	31,054-	254-49-A-	35
VE3AKD	20,231-	175-59-B—	
VE3MW	20,029-	164-49-A—	
VE3DH	19,285-	204-38-A-	19
VE3DU	17,383-	177-39-A-	21
VE3SR	13,197-	128-53-B-	11
VE3QT	11,258-	119-38-A-	17
VE3GI	10,450-	106-40-A-	25
VE3ZC	6570-	74-36-A-	9
VE3ATY	3600-	45-32-A-	14
VE3API	420-	15-14-B-	5
Quebec			
VE2NI	62,319-	384-65-A-	40
VE2FG	43,432-	356-61-B-	38
VE2OL	32,060-	229-56-A-	21
VE2BK	29,510-	229-65-B-	17
VE2GM	26,855-	262-41-A-	21
Alberta			
VE6UB	51,810-	314-66-A-	37
VE6BO	43,463-	290-61-A-	30
VE6EO	42,060-	355-60-B-	35
VE6DK	14,484-	142-51-B-	13
VE6MA	12,705-	122-42-A-	17
VE6GG	2880-	95-16-B-	21
British Columbia			
VE7ALE[7]	74,375-	425-70-A-	35
VE7AEC	65,462-	461-71-B-	40
VE7VX	60,550-	347-70-A-	34
VE7EH	49,962-	382-66-B-	31
VE7OK	49,111-	367-67-B-	40
VE7JO	43,158-	283-61-A-	35
VE7AC	39,168-	306-64-B-	31
VE7XA	28,210-	217-52-A-	36
VE7ANU	15,504-	157-51-B-	34
VE7QH	6300-	84-30-A-	37
VE7AGZ	3064-	65-19-A-	21
VE7XW	648-	36- 9-B-	6
VE7ACS	(VE7s AHW AOB BTF CS NV WV)		
	18,424-	196-47-B-	40
Yukon			
VE8AK	2500-	50-20-A-	7
Manitoba			
VE4NS	34,860-	249-70-B-	31
VE4YZ	16,912-	155-56-B-	16
VE4HS	8910-	84-44-A-	15
VE4SS	7215-	101-37-	-17
VE4WE	5154-	67-31-A-	8
VE4SF	4813-	56-35-A—	
Saskatchewan			
VE5QZ	93,543-	529-71-A-	37
VE5MQ	49,075-	302-65-A-	2
VE5LV	5920-	74-32-A-	23

[5] Operated by W5LIU.
[6] Operated by VE3BSL.
[7] Not eligible for award. Entry submitted after deadline specified by rules.

Hints & Kinks

(*Continued from page 65*)

least one case it was right in the middle of TV Channel 6, resulting in a weird case of TVI where interference was present only when the key was *open!* These parasitics yield to the usual treatment of inserting an r.f. choke such as the Ohmite Z-144 or Z-50 (depending on the frequency of the parasitic) right at the plate connection of the 6Y6. It may be significant that in cases where parasitics were encountered, the clamper tube was installed in the power-supply chassis instead of close to the amplifier tube. Thus, short leads seem to pay off again. — *W1FTX*

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73, Bil Harrison, W2AVA

LYSCO'S TVI-LESS BAND SWITCHING VFO TRANSMITTER

Send for illustrated descriptive bulletin.

- TVI SUPPRESSED! – Xmtr designed with 3-section, low-pass filter incorporated in output – all leads by-passed for RF – most effective shielding – etc., etc.
- 35 WATTS! – 6AG7 Clapp Oscillator, 6AG7 Buffer Doubler, and 807 Final Amplifier with 35 watts input on all bands.
- VFO CONTROL! – Calibrated output on 10, 11, 15, 20, 40, 80, and 160 meters. Provision for crystal control, too!
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- FINGER TIP CONTROL! – Completely band switching! All controls, xtal socket, VFO-xtal selector switch, etc., on front panel. Large illuminated vernier dial.
- REGULATED SUPPLY! – Built-in supply uses VR-150 voltage regulator and 5R4GY, high output rectifier!

Excellent as a compact portable or home station transmitter. Coaxial connector output to 50 to 75 ohm cable to feed antenna or high power amplifier. Attractive metal cabinet finished in black crackle with chromium trim – 15" x 9" x 8" deep. Weighs 35 lbs. Supplied complete with all tubes. Nothing more to buy! Simply plug into 115V AC line! Complete installation and operation instructions including antenna data furnished. Operate all bands – QSY at will – eliminate TVI!

Lysco Transmaster Model 600 **$99.50**

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Only **$179.50**

Here's the new SX-71, a receiver designed expressly to give superior ham band performance, incorporating features found only in the highest priced receivers – and then some!

Continuous coverage from 538 KC to 35 MC, and 48 MC to 56 MC – and look at that big directly calibrated amateur bandspread dial. Built-in limiter and balanced detector stages for hiss-free NBFM reception. Double conversion gives better than 300 to 1 image rejection.

HARRISON HAM-A-LOG

Don't miss any of the 1001 amazing bargains in our Holiday HAM-A-LOG! Features HARMONIKERS, all models – laboratory wired, ready to use – complete kits – stock of all necessary Harmonikers parts including special condensers and copper plated utility boxes! Check your HAM-A-LOG carefully for values in transmitters, TVI elimination aids, mobile xmtrs and converters, antenna rotators, new type police whips, and the WORLD'S BIGGEST BARGAINS in power transformers and beam antennas! Don't miss these super-values! Send for your copy today! A postcard will do.

20-FOOT MAGNESIUM LADDER BOOMS

These 20-foot straight ladders make excellent booms for optimum spaced four-element ten or three-element twenty meter beams – also ideal for dual 10/20 meter beam boom! Lightweight – only 22 lbs! Rigid, girder type construction. Requires no painting or maintenance after installation!

New reduced price **Only $35.95**

20' Magnesium Ladder

PREMAX CORULITE BEAM ANTENNA ELEMENTS

Elements for four-element ten meter beam	$21.00
Elements for three-element twenty meter beam	$33.50

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It will pay you to send for our special bulletin No. 221.

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MOBILE HAMS

Complete mobile package — nothing else to buy. Outstanding mobile signals use motorola equipment — backed by years of communication equipment experience — World's largest producer of 2-way mobile equipment.

A mobile transmitter with a double feature FM or AM at flip of the switch, the MOTOROLA FMT-30-DMS (27–30 MC.). $130.00

MOTOROLA P-69-13-ARS receiver with special noise limiter for use with any converter having 1500–3000 KC. $60.00

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3-30 famous Gon-set converter complete to connect to the P-69-13-ARS receiver.... $39.95

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The above comes complete with all necessary accessories and mounting hardware. Order direct or through the Motorola National Service Organization member in your area.

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GRID DIPPER OSCILLATOR KIT $21.50

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6205 MARKET STREET • West Phila.
6th & ORANGE STS. • Wilmington
4401 VENTNOR AVE. • Atlantic City

2-Meter Station

(*Continued from page 47*)

zontally. The position should be determined by the polarization in use in one's own neighborhood. Except under very favorable conditions one cannot expect to work more than 30 or 40 miles with such simple antenna systems. This may be enough to provide many contacts in areas of dense population, but the enterprising 2-meter enthusiast will want something better soon.

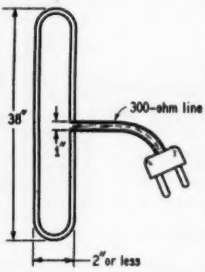


Fig. 8 — A simple antenna for 2-meter work is the folded dipole. This may be made of any metal tubing, rod, or wire that may be bent into the desired shape. It is fed with 300-ohm Twin-Lead, terminated with a Millen 37412 plug, to fit the antenna terminal on the control unit. The antenna may be used either horizontal or vertical, depending on the polarization used in one's own locality.

Experimental work with high-gain antenna arrays is, in fact, one of the most intriguing fields of amateur endeavor. Because of the relatively-small size of arrays for 144 Mc. the 2-meter worker can almost always find room for something better than the simplest dipole, and he will find that the results obtained will be directly proportional to the effort he spends in putting up the best antenna within his means.

—•••—

Two minor errors in the parts list for the 2-meter converter, Part I, have come to our attention. Under Fig. 1, R_2 should be 10,000 ohms, ½ watt, instead of 1 watt. C_7, C_9, C_{10}, and C_{11}, the 0.005-μfd. ceramic condensers, should be Sprague 29C-1. The 29C-4 specified is actually 0.001 μfd., but either type may be used.

Crystal Filters

(*Continued from page 59*)

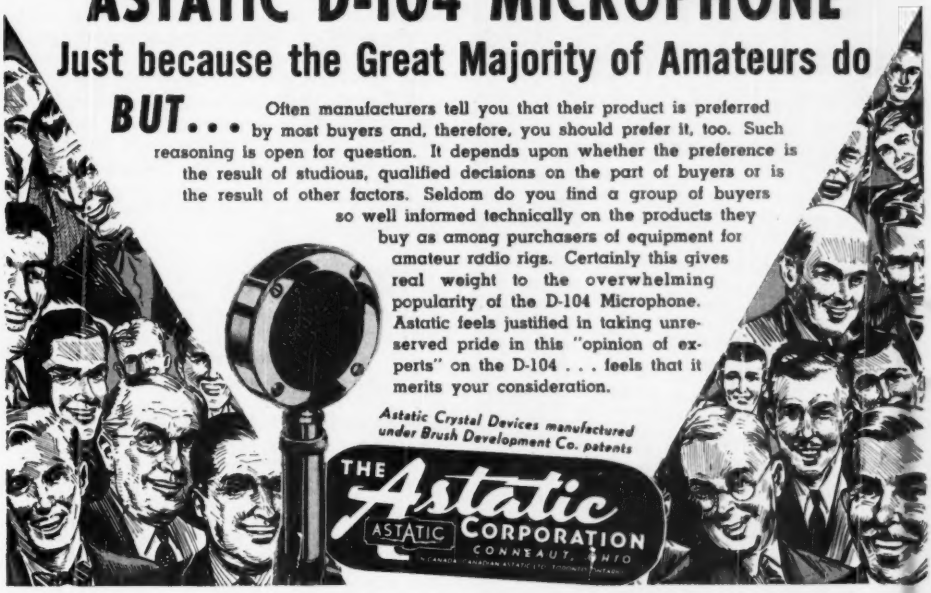
proper use of the phasing control by which interfering signals can be dropped to a very low level. Try increasing and decreasing the capacity of C_2, and you will be amazed to find that heterodynes and cross talk can often be reduced to a point where they are not even noticed. It may be necessary to tune slightly on either sideband when "phasing out" interference.

Even when operating correctly it will be necessary to advance the audio gain and possibly the r.f. gain control on the sharp position, but the loss is in the high-frequency audio components rather than the r.f. There may be a slight reduction in r.f. gain but, if the signal is tuned carefully on sharp positions, the loss in sensitivity is very small. Careful checks on our particular filter show no appreciable reduction in r.f. gain.

That's it, boys — an addition to your receiving set-up that can give you a new outlook on QRM and certainly help on both 'phone and c.w. Build it up, use it for a day, and you'll be sold.

Of Course You don't have to PREFER the ASTATIC D-104 MICROPHONE

Just because the Great Majority of Amateurs do



BUT... Often manufacturers tell you that their product is preferred by most buyers and, therefore, you should prefer it, too. Such reasoning is open for question. It depends upon whether the preference is the result of studious, qualified decisions on the part of buyers or is the result of other factors. Seldom do you find a group of buyers so well informed technically on the products they buy as among purchasers of equipment for amateur radio rigs. Certainly this gives real weight to the overwhelming popularity of the D-104 Microphone. Astatic feels justified in taking unreserved pride in this "opinion of experts" on the D-104 . . . feels that it merits your consideration.

Astatic Crystal Devices manufactured under Brush Development Co. patents

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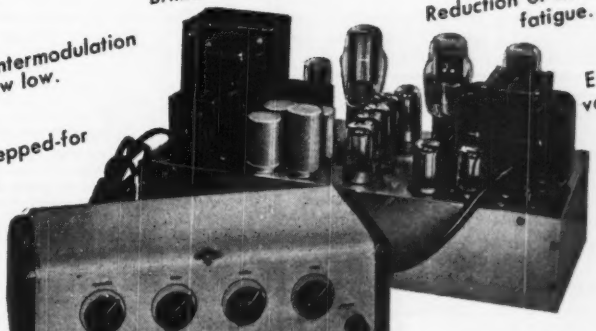

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(Illus. Model 10C3-30 watts)
Also available: Model 12A3-10 watts.

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Big Tower Reliability
in an INEXPENSIVE LIGHT-WEIGHT MAST
Here's the new Trylon mast that's attracting the attention of radio amateurs, experimenters and commercial operators everywhere. Weighing only 2 lbs. per foot—but able to take winds up to 125 mph depending upon antenna wind area—it is easy to erect . . . easy to climb. Available in 10 ft. sections to a height of 60 ft. . . . at a cost of little more than $1 a foot. Double-welded, hot dip galvanized—packed complete with fittings. Takes almost any kind of antenna. Write for Circular "Q."
WIND TURBINE CO.
Mast and tower specialists for 17 years
West Chester
Pennsylvania

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COUNTRIES

See page 93

CALL LETTER PLATES
Type A-18 - For Your Car
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W8ENH
$2.95 POSTPAID
A large, sturdy cast aluminum plate with satin-finished letters and border against a black baked enamel background. Red, green, blue and gray -- 50¢ extra. Size - 2¼" x 8¼" with 1½" letters.
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An attractive metal button with highly polished raised letters against a black background. Other colors 50¢ extra.
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Type A-26L With Screw Backing
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SREPCO, Inc.
STANDARD RADIO & ELECTRONIC PRODUCTS
CASH WITH ORDER

50 Years of Progress

(*Continued from page 49*)

clusions have been reached beyond the fact that the phenomenon exists. But remember — amateurs noticed it first!

Neophytes will be interested in simple equations that can be used to determine S reports when working a country from which they have no QSL card, thus eliminating any guesswork or personal factors. After thorough study and two weeks use of the autocorollator and the differential analyzer made available through the courtesy of M.I.T., the following relations were derived. DX signal strength reports can be determined by

$$S = 6 + N/33 \quad \text{for } N < 100$$
$$\text{or } S = 7 + (N - 50)/75 \quad \text{for } 100 < N < 200$$

In either equation, N = number of countries confirmed by card. S is given in the nearest whole number.

Conclusions

The history of amateur radio is a glorious one of 50 years of progress. A proud history, and who knows what the next 50 years will bring? Surely we need new fields to conquer.

How's DX?

(*Continued from page 67*)

New York City, N. Y. . . . . W4BYF has good news from PJ5TR. Liberalization of amateur regulations in Curacao is anticipated in the near future. W8WWU got quite a bang from being PJ5KG's first QSO, the latter employing a freshly-homebrewed rig . . . . . LZ1ID/XX is still sending cards through as W9AND will attest and, in a P.S., the fellow lays claim to being the only ham in Bulgaria (and strictly under cover) . . . . . PK1RI tipped off W8DAW anent a PK1 QSL bureau as "% Factory, Djakarta, Indonesia," while ZD4AU would like to clear up his QSL debts as W1IKE is informed and may be reached in this respect as follows: J. L. Speer, Opns-Joburg, Mail Clerk, Pan-American Airways, LaGuardia Field, N. Y. . . . . Ex-F9QU/FM8, now FM7WE, vows to lick his QSL backlog and wishes his W contacts be patient, says W4PJU. We'll cast about for some info concerning the new switches in French Colonial prefixes (numerals) although it appears a matter of small importance since alphabetically they are still fairly consistent . . . . . HB9JJ will put HE1JJ on the air April 7th through 10th and will try to give 3.5-, 7- and 14-Mc. c.w. a try as well as 3.5 and 7-Mc. 'phone. Charly is a 100%-QSL man and you may fire him cards direct or via USKA.

— . . . —

W9s OLU and TO express considerable curiosity as to what country the prefix EX1 represents inasmuch as so many QSLs from EX1T are to be noted adorning the doorways of public buildings. He's a new one to us, we'll admit, but savors a reminiscence of the PR1VVY confirmations tacked up on shacks in rural areas, now less often seen.

Correspondence

(*Continued from page 62*)

more fun to a low-power job than with the big ones. For me the difficulty lends enchantment and the kick when some remote bird comes back is greater because of the low power.

Now it is not easy but there are tricks one can use. A VFO is essential and break-in is essential. You gotta stay away from the pile-ups where a lot of high-power boys are fighting each other. You must pick clear spots in the band, and you must know which band to use at what times of day. Many is the time I have run away with some DX by calling a little below or above the pile-up and thus I leave the h.p. boys to fight themselves to a standstill while I QSO the DX.

Another thing you must do is to go to bed early and get up early, say 8 P.M. and 2 A.M., if you want DX. Then the local boys are tired out with their h.p. fights and the little pip squeak you operate has a chance.

So the low-power boys can do it too!

— *Keith Henney, W1QGU/K2BH*

2 New Harmonic Filters

by R. L. Drake

for TVI Reduction

20-Meter Half-Wave Filter

TV-300-20HW

$10.95 Amateur Net

22.5 Mc. Cut-off Low Pass Filter

TV-52-20LP

$12.95 Amateur Net

ATTENTION 20-METER MENI If your 2nd and 3rd harmonics are interfering with other services, in addition to TVI from your higher harmonics, these new Harmonic Filters are just what the doctor ordered.

The TV-300-20HW is patterned after the "G. E. Harmonikar" and uses same construction as our TV-300-10HW 10-11 Meter Filter announced in March QST. Attenuates all harmonics of a 20 meter xmtr. For use in 300-ohm twin lead or open lines 200 to 600 ohm. Will handle a 1 KW AM phone xmtr.

TV-300-10HW For 10-11 Meter Xmtrs.
TV-300-20HW For 20 Meter Xmtrs.

Either Model **$10.95** Amateur Net.

★ ★ ★

The TV-52-20LP is identical to our popular TV-52-40LP except the cut-off frequency has been lowered to 22.5 Mc. for attenuation of the 2nd and 3rd harmonics of 20-meter xmtrs in addition to all harmonics in the TV bands. Use in 52 or 72 ohm coax lines or coupling links. Will handle a KW.

TV-52-20LP Cut-off 22.5 Mc., for xmtrs 15 to 160 mtrs.
TV-52-40LP Cut-off 44.5 Mc., for xmtrs 10 to 160 mtrs.

Either Model **$12.95** Amateur Net.

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TV-300LP Low Pass Filter for 300-ohm Twin Lead. Cut-off 44.5 Mc., for xmtrs 10 to 160 mtrs. **$12.95** Amateur Net.

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Installed in the antenna input to a TV set this filter suppresses interference (50 mc. and lower), from amateur xmtrs and many other sources. Especially effective where fundamental overloads the TV set. Write for our folder "The Need for a High Pass Filter."

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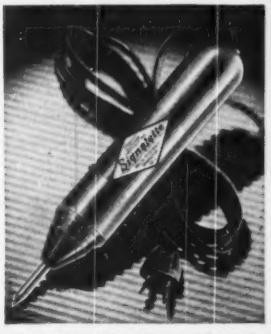
Signalette

MULTI-FREQUENCY GENERATOR

$9.95 at distributor or postpaid, direct. No C.O.D.'s, please. Ohioan's add 3% State Sales Tax.



CLIPPARD INSTRUMENT LABORATORY, INC.
Dept. E, 1125 Bank Street, Cincinnati 14, Ohio
Qualified Jobbers write, wire for details

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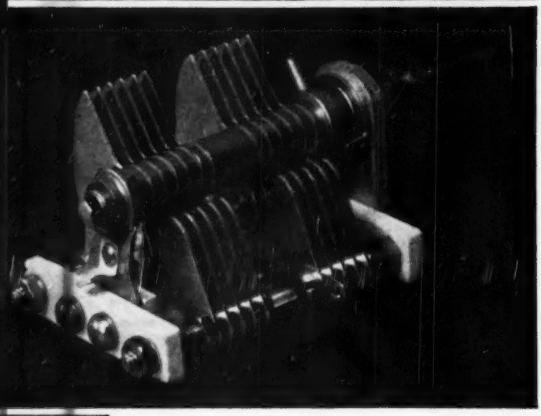
• Proven
• Dependable
• Quality



RECEIVING TYPE CONDENSERS

National's famous receiving-type condensers are available with either straight-line wavelength plate shape or straight-line capacity plate shape. Special features can be supplied in quantity, such as serrated rotor plates, staked rotor and stator plates, shaft extensions for ganging and special capacities as high as 335 mmf. for single-section and 100 mmf. per section for dual condensers. Commercial inquiries invited.

National

NATIONAL COMPANY, Inc.
MALDEN, MASSACHUSETTS

A.R.R.L. QSL BUREAU

The ARRL maintains a QSL bureau system to make it easy for you to receive your DX QSL cards, but in order for it to function it is necessary that we receive your coöperation. All you have to do is send the QSL manager for your call area a stamped self-addressed envelope of the No. 10 stationer's size (No. 8 post-office size), with your name and address in the customary place and your call letters printed prominently in the upper left-hand corner. When he has an envelope full of cards for you, he'll return the envelope to you. Upon receipt of that envelope, be sure to send him another.

If you've previously held a different call, send an envelope to the manager for that call area. All QSLs for portable operation are routed via the *home district*.

Do not send cards for other W or VE stations for distribution via the QSL bureau; they cannot be accepted. Likewise, do not send cards for distribution to foreign stations via this domestic QSL bureau system. For the addresses of the proper bureaus to which foreign cards may be sent, see page 61 of December, 1949, *QST*.

The bureau handles only incoming DX QSLs.

W1, K1 — Frederick W. Reynolds, W1JNX, 83 Needham St., Dedham, Mass.
W2, K2 — Henry W. Yahnel, W2SN, Lake Ave., Helmetta, N. J.
W3, K3 — Jesse Bieberman, W3KT, Box 34, Philadelphia, Penna.
W4, K4 — Johnny Dortch, W4DDF, 1611 East Cahal Ave., Nashville, Tenn.
W5, K5 — L. W. May, jr., W5AJG, 9428 Hobart St., Dallas 18, Texas
W6, K6 — Horace R. Greer, W6TI, 414 Fairmount St., Oakland, Calif.
W7, K7 — Mary Ann Tatro, W7FWR, 513 N. Central, Olympia, Wash.
W8, K8 — William B. Davis, W8JNF, 4228 W. 217th St., Cleveland 16, Ohio
W9, K9 — John F. Schneider, W9CFT, 311 W. Ross Ave., Wausau, Wisc.
WØ, KØ — Alva A. Smith, WØDMA, 238 East Main St., Caledonia, Minn.
VE1 — L. J. Fader, VE1FQ, 125 Henry St., Halifax, N. S.
VE2 — Austin A. W. Smith, VE2UW, 6164 Jeanne Mance, Montreal 8, Que.
VE3 — W. Bert Knowles, VE3QB, Lanark, Ont.
VE4 — Len Cuff, VE4LC, 286 Rutland St., St. James, Man.
VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
VE6 — W. R. Savage, VE6EO, 329 15th St., North Lethbridge, Alta.
VE7 — H. R. Hough, VE7HR, 1785 Emerson St., Victoria, B. C.
VE8 — Jack Spall, VE8AS, P. O. Box 268, Whitehorse, Y. T.
KP4 — E. W. Mayer, KP4KD, P. O. Box 1061, San Juan, P. R.
KZ5 — C.Z.A.R.A., Box 407, Balboa, Canal Zone
KH6 — Andy H. Fuchikami, KH6BA, 2543 Namauu Dr., Honolulu, T. H.
KL7 — Box 73, Douglas, Alaska

SWITCH TO SAFETY!

LOOK! IT'S MOBILE RADIO TIME AT B-A!

6 VOLT DYNAMOTOR

USUAL LIST PRICE $82!

Only $9.88 Output 425 V. At 375 MA

EVEN BETTER, MORE COMPACT THAN THE FAMOUS PE103!

Weighs only 9 lbs., overall length 7 inches, height 4 inches. Has standard 4-hole mtg. base and black wrinkle finish case. Input current 46 amps. when loaded to maximum output of 425 V. at 375 MA. On actual test, other ratings are 30 A. input with 285 MA load, 25 A. input at 160 MA load, 20 A. input with 100 MA load. Both windings completely isolated from frame.

Top make, beautifully engineered. Originally manufactured for use with Western Electric equipment. Brand spanking new in original factory cartons. Shipping weight, 11 lbs. No. 32B235—Available only at B-A!.....$9.88 For Parcel Post Shipment add 91c (over remittance promptly refunded.)

WATCH FOR THE LATEST B-A BARGAIN CATALOG LISTING OTHER ITEMS FOR MOBILE OPERATION

WRITE US IF NOT ALREADY ON OUR LIST

B-A BURSTEIN-APPLEBEE CO. 1012-14 McGEE ST. KANSAS CITY 6, MO

RCA

RADIO and TELEVISION

Thorough Training in All Technical Phases

APPROVED FOR VETERANS

WEEKLY RATES DAYS—EVENINGS

FREE PLACEMENT SERVICE for GRADUATES

For Free Catalog write Dept. ST-50

RCA INSTITUTES, INC.

A Service of Radio Corporation of America

350 WEST 4th ST., NEW YORK 14, N. Y.

TRAIN FOR ALL TYPES FCC (RADIO OPERATOR) LICENSES

Complete Raytheon AM and FM broadcast transmitters and studio control equipment. Also TV camera chain unit. 30th anniversary year. Send for catalog **Q.**

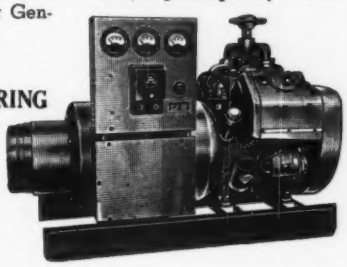
MASS. RADIO SCHOOL

271 Huntington Avenue **Boston 15, Massachusetts**

Lic. by Comm. Mass. Dept. Ed.

WHAT! NO LIGHTS!

Sizes range from small portable 300 Watts to 300 K. W. Mfgrs. of Converters, high frequency Generators, Motor Generator sets.



KATO ENGINEERING COMPANY

1437 First Avenue

Mankato

Minnesota

HAM-ADS

(1) Advertising shall pertain to radio and shall be of nature of interest to radio amateurs or experimenters in their pursuit of the art.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others.

(3) The Ham-Ad rate is 30¢ per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy. No cash or contact discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 25th of the second month preceding publication date.

(6) A special rate of 7¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature and is placed and signed by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, if by a member of the American Radio Relay League takes the 7¢ rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising by him takes the 30¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested signature and address be printed plainly.

(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

Having made no investigation of the advertisers in the classified columns, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

Please note the 7¢ rate on hamads is available to ARRL members only.

QUARTZ — Direct importers from Brazil of best quality pure quartz suitable for making piezo-electric crystals. Diamond Drill Carbon Co., 719 World Bldg. New York City.

QSLs. 100, $1.25 up. Stamp for samples. Griffeth, W3FSW, 1042 Pine Heights Ave., Baltimore 29, Md.

AMATEUR radio licenses. Complete theory preparation for passing amateur radio examinations. Home study and resident courses. American Radio Institute, 101 West 63rd Street, New York City.

QSL's. SWL's. Finest stock. Fairest prices. Faster service. Dossett, W9BHV QSL Factory, 857 Burlington, Frankfort, Ind.

QSLS! Kromkote cards at a fair price. Dauphinee, W1KMP, Box 219, Cambridge 39, Mass.

SUBSCRIPTIONS. Radio publications a specialty. Earl Mead, Huntley, Montana, W7LCM.

DON's QSL's. "The finest". Samples. 2106 South Sixteenth Avenue, Maywood, Illinois.

QSL's high quality, fair prices. Samples? W7GPP R. D. Dawson, 1308 F Street, The Dalles, Oregon.

10-METER Beams, $19.50. Send Card for free information, Riverside Tool Co., Box 87, Riverside, Illinois.

ZIPPO lighter, ARRL insignia and call sign, inlaid enamel, $5.00. Ideal birthday gift. McCarron, W2BNO, 3050 Decatur Avenue, New York 67, N. Y.

QSL Quality cards, priced right! Samples. Ferris, W9UTL, 1768 Fruitdale, Indianapolis, Ind.

QSL's, SWL's. Samples free. W4HUD, Albertson, Box 322, High Point, N. C.

CRYSTALS: Bassett Type 100A precision low-drift units made to your exact specified frequency within the 80 or 40 or 20 amateur bands, at $1.50 each, plus postage. Rex Bassett, Inc., Bassett Building. Ft. Lauderdale, Fla.

MOBILE antenna mounts: spring type, whip detachable for garaging, mountable without visible body holes, price, $3.75, postpaid. Wayne, W1PFB, 130 Mount Vernon St., Middletown, Conn.

WANTED: QST for February, March, July 1916. I have 500 other copies QST and Radio for trade or sale. W9MCX, 1022 N. Rockhill Rd., Rock Hill, 19 Mo.

WANTED: Pre-war National NC-101X receiver. R. H. Dempsey, 1731 N. E. 10th, Portland, Oregon.

CARBON tetrachloride, cleaner, solvent 27 oz., $1.50. Polystyrene high frequency coil and splice dope, $1.00 pint. Special thinner, 65¢ pint. Craft Chemical Lab., 453½ East Exchange St., Akron 4, Ohio.

SELL: 450 watt cw xmitter, Pr 812's final, Millen exciter, 400 volt and 1500 volt power supplies, 6 ft. standard oak relay rack, $125.00 crated for shipment. 450 watt 'phone xmitter, Pr. T35s final, Millen exciter, 500 volt and 1800 volt power supplies, 6 ft. standard metal relay rack, pr. 203Z modulator with 1800 volt power supply pr. 2A3 speech amp., $210.00. Crated for shipment. Lawrence Hokanson, W9FVT, Wheaton, Minnesota.

SELL: HT-9 new condition, extra 814, coils for 10 and 20 meters, $150.00. W2MCZ. Kavanaugh, 3311 Broadway, New York 31, N. Y.

QSLS of distinction. Three colors and up. Rainbow map QSLs. Special DX QSLs. Samples. Uncle Fred, Box 86, Lynn, Penna.

LOOKING for good clean copy of "Ban Off!" Pink Sheet 1919 Supplement. Write to E. Collins, 83 Deerfield, Manchester, Conn.

CARDS? QSLS? SWLS? "America's Finest". No cheap trash! QSL samples, 3¢. Sakkers, W8DED, Holland, Michigan. One-day QSL service! Made-to-order QSLs if desired. (Veteran).

GREAT LAKES Division ARRL Convention Hotel Statler, Detroit, May 27–28–29. Registration and Banquet, $7.50. Mammoth Swap 'n' Shop session! Contests! Technical talks. Write to Box 903, Detroit 31, Michigan, for tickets or buy through local club or dealer.

SELL Collins 32V-1, nearly new, $450.00. Meissner 150-B, excellent, $200.00. RCA 155-C 'scope, new, $65.00. Interested in Collins K.W. Farano, W7HCJ, Box 167, Dishman, Wash.

TO settle W3IET estate. Best offer for following: Hallicrafters S-36A, National 183, 350-watt 800SS transmitter, modulator TZ-40S, Clarion speech, in 4 ft. Bud cabinet, 160 to 10, xtals and mike, working, best parts used in construction. Model 420SP volt ohmmeter 0–1000 V, 0–100 Ma. Mrs. Mary C. Frazer, 130 Front St., Lewes, Delaware.

SELLING: Hammarlund 4-20 transmitter and 4-11 modulator with coils for 10 and 20 meters, $50.00. New SCR-522 transmitter and receiver, $25.00. Millen exciter, $30.00. Sonar XE-10 FM exciter, $28.00. All units are in excellent condition. Write Kenneth L. Henenberg, 305 West 45th Street, New York, N. Y. or phone Ci 5-9044.

BC-610E with all coils in gud condx, $475.00. for quick sale. No shipping, pick-up only. RME-45 recvr like new, $100.00. W8BPX, 1802 Berkley, Cincinnati, Ohio.

30-WATT complete all band living room console, 48" wide, drop leaf operating table, foot switch controls relays, all components plug-in, 'phone C.W., VFO, NC-100X, receiver, rugged antennas, terrific DX, ideal for beginner, ready to plug in and operate. Cost $500.00. Best offer takes. W2WK, 5 Koelbel Court, Baldwin, N. Y.

RECENTLY re-aligned RME-45 receiver and DB-22A Preselector, both for $125.00. SP-44 Panoramic Adaptor, used less than one hour, $50.00. RME "Boomerang", never used, $18.00. "Mon-Key", never used, $20.00. All F.o.b. E. V. Carpenter, W8KSF, 34566 Chestnut St., Wayne, Mich.

WANTED: HT-144 Handi-Talki or any other make. #800 McMurdo Silver receiver or 2 meter converter. State age, condition, performance and price. Oscar Floy, Thornton, Iowa.

MODERN QSLs. Sample booklet, 12 cents. Stamps ok. Westerners see samples at leading Ham stores. van Groos, W6GFY, 1436 N. Serrano, Hollywood 27, Calif.

W1HJI Cushing QSLs, SWLs. Samples free. Box 32A, Manchester, N. H.

STATION, complete, modern, commercial style. Trade towards new car or cash sale. Photograph. Particulars on request. J. P. Neil, VE3PN, 207 Charlotte St., Ottawa, Ont., Canada.

QST 1923 thru 1933 almost complete, six 1922, four 1936, total 161 copies. For best offer, F.o.b. North Orange Mass. Bob Briggs.

QSLS made to order. Ham stationery. Prices right. Samples. Snyder, W9DRH Print, Peru, Indiana.

UNITED States Navy synchros, 166-page textbook on Description and Operation of Selsyns. Brand new. Crammed with diagrammatic hook-ups and explanations. $1.75 postpaid. Frank Dunan, W3NB, 1717 Lang Place, N.E. Washington 2, D.C.

BARGAINS: New and reconditioned Collins, National, Hallicrafters, Hammarlund, RME, Millen, Meissner, etc. Reconditioned S-38, $29.00; S-40A, $59.00; SX-42, $179.00; NC-173, $139.00; NC-183, $199.00; HQ-129X, $129.00; RME-84, $59.00; RME-45, $89.00; DB-22A, HF-10-20, VHF152A, NC-57, NC-240D, HRO-7, SX-43, S-5, S-47, Collins 75A, BC-610, etc. Shipped on approval. Terms. List free. Henry Radio, Butler Mo.

C. FRITZ QSL's. Samples. 1213 Briargate, Joliet, Ill.

WANT to swap my Conn Copron bell trumpet in new case, just factory reconditioned, for any first-class receiver in new or near-new condition. James Lark, 2223 N. Quincy, Tulsa, Okla.

SELL or trade: 100-watt c.w. transmitter, complete, $65.00, or trade for BC-348, converted to A.C., in good condition. Pictures and details upon request. W8QDF, Carroll, Naylor Route, Clarendon, Texas.

FOR sale: BC-654, in good condition. Complete. Best offer. J. Anderson, W9IDA, 115 W. Porter St., Oglesby, Ill.

FOR sale: One PE-103 dynamotor. Brand new, and never used. $15.00. J. E. Greve, W9DGV(ARRL), 1025 20th st., Rock Island, Ill.

COMPLETE new 75. 80 meters fone, c.w. station. ARC-5 transmitter, receiver, speech amp and modulators, three separate power supplies, crystal mike, $50 for all. BC-610 exciter deck $15.00. Pair 813's, $8.00. 2500 watts Class B audio $50. W2BIG, Commodore Hotel, Atlantic City, N. J.

WANT contact local ham who can custom-build me 150-watt final in TVI-proofed cabinet, reasonably. George M. Clark, jr., W2JBL, 222 Hicks Street, Apt. 4C, Brooklyn 2, N. Y.

QUITTING: Selling Webster Model 80 wire recorder, new BC-223 transmitter 2000–3000 Kc and 3000–5000 Kc coils, BC-348 receiver, integral power supply, 12-inch Stromberg speaker included, $65.00; ART-13 transmitter, new tubes, plugs control unit, perfect for $125.00. Ship-to-shore 15-watt transmitter/receiver 6 or 12 volt operation, $80.00. Riders volumes 1 through 5, $6.00 each; 20 years of QST, IRE Proceedings and others. Fitch, W3AW, 2510 Ellamont, Baltimore 16, Md.

MAGNETIC recording wire, buy the pound or regular spools. Also stranded steel guy wire, $3.25/500'. Webster wire recorder, two for sale, one nearly new. Best offer. Also HRO5TA1, Collins ART-13. W2AOP/W1, Box 35, Brookfield, Mass.

NEW YORK CITY vicinity: Sell HT-9, coils 40, 20, 10; Spare 814, $225.00; Meissner EX Signal Shifter, $50.00; New PE103 case never opened, with cable connector, $12.00. All cash and carry. Demonstration on air first. W2VQD, Evergreen 7-8922.

QSLS-SWLS: High quality. Reasonable prices. Free samples. Write to Bob Teachout, W1FSV, 40 Elm Street, Rutland, Vt.

SELL: One KW transmitter on 10 in. two 6 foot grey crackle cabinets, final a pair of 4-400A, spares, pair of 4-250A, 805s, 872s. Picture if interested. Delivered and set up within 250 miles, $1100.00. Also have an RAK7 long-wave receiver, set spare tubes, $100.00. Two PE103s at $10.00 and $15.00. W9BSG, Leo Hodgeman, Odell, Ill.

LARGE lot of ham equipment and miscellaneous parts, priced to sell. Send for list. W9SGG, 535 Platte, Colorado Springs, Colo.

INSTRUCTOGRAPH for sale, just reconditioned at factory, 19 tapes, 9 advanced, $25.00. Paul Allen, 4208 N. Kenmore, Chicago, Illinois.

10 and 20 Meter beams: $19.25, up. Aluminum tubing, etc. Willard Radcliff, Fostoria, Ohio.

BC-614-E, JB-70-A, BC-610 (Built from original surplus parts). Best offer over $250.00. Must inspect before offer. W9QGH.

QSLS, SWLS printed on beautiful Crystalion or regular stock. Stamp for samples, Franzen, W2DEE, Maple Shade, N. J.

WANTED: Three Wilcox CW 3 fixed frequency receivers with or without 80-meter coils. Will buy or exchange for three F3 Wilcox brand new receivers. D. E. Cartwright, W8UPB.

QSLS. The finest there are. Samples today will prove it by far. Larry's QSL Shop, P. O. Box 59, Opportunity, Wash.

INFORMATION whereabouts Harry W. Dail, W2OGV. Urgent. Mrs. S. D. Dail, 27 E. Quackenbush Ave., Dumont, N. J. Tel. Du 4-5354.

MUST sell ham and miscellaneous radio equipment. Reason: changing location. X'mtg power supplies, finals; rcvg equipment; parts, tubes, meters. Send for list. No reasonable offer refused. Ralph Schultz, 1444 South 15th Avenue, Maywood, Illinois.

SWLS, QSLS. 3¢ stamp. Harrison, 8001 Piney Branch Road, Silver Spring, Md.

BARGAINS: New and used transmitters-receivers-parts: Globe King, $299.00; HT-9 $275.00; Supreme AF100 $299.00; Sonar SRT-75, $149.00; new 150 watt phone $199.00; 60-watt phone, $99.00; Globe Trotter, $57.50; HT-17, $29.50; New Meissner Signal Calibrators, $29.95; MB611, $29.50; NC240D, $165.00; HRO complete, $129.00; SX43, NC173, HQ-129X, $139.00; RME-45, SX-25, $99.00; S-38, $29.95; S-41, $22.50; latest signal shifter, $59.50; DB22A, $49.00; BC-610's and many others. Large stock of trade-ins. Free trial. Terms are financed by Leo, WØGFQ. Write for catalog and the best deal to World Radio Laboratories, 740–44 West Broadway, Council Bluffs, Iowa.

WANTED: VHF-152-A. State price and condition. W1MVO, 128 Ridge Road, Revere, Mass.

QSLS, SWLS. Very attractive. Best in printing and prices. Kromekote or any other stocks. Samples. W4LXJ Press, Roop, Radford, Va.

SELL: Late model RME-45 with speaker, perfect condx. $100.00. W2TWF, Culver Lane, East Moriches, N. Y.

NEW YORK CITY hams only! Sell 200 w. fone/cw transmitter, TZ40s final, 807s Class AB2 modulator, standard parts, Par-Metal 37" de Luxe cabinet, BC-459A, new, and other items. Call Bill Tannenbaum, W2VG, 2296 Grand Avenue, Bronx 53, N. Y. FO 5-1326.

"TAB" buys! 866A kit, 2 tubes; 2.5 Vct/10a/10KV transformer, sockets, $5.95. 2J1G1-GE Selsyns, used tested guaranteed, pair $1.49; BC-456 modulator, less tubes, dynamotor, as is, 98¢. Crystal diodes, 1N21, 39¢; 1N34, 78¢. Free "Tabogram". "TAB", 109 Liberty St., New York City, N. Y.

WESTON test equipment. 564 voltohmeter, $17.00; 689 low ohmmeter, $11.00; 785 Industrial analyzer, $79.50; 698 set servicer, $5.00; 571 output meter, $14.00; sensitive aircraft altimeters, $6.95. New Pierce chronograph wristwatch $14.95. H. McEttee, W2SI, 490 Fairfield, Ridgewood, N. J.

VHF152-A, factory reconditioned, $50.00. WØPLJ, Matt Schuch, Jackson, Missouri.

NC-173, speaker, excellent condition, $130.00. Randolph Neal, 713 Spring St., Atlanta, Ga.

WANTED: 500-watt modulation transformer. E. Dillman, W7NM, 1231 East 91st St., Seattle, Wash.

QSLS! G. L. Taylor, Sumrall, Mississippi.

SALE: BC-221-J, original xtal and calibration book, less power supply. Slightly used, $58.00. W. McMurray, W4JQO, Forest City, N. C.

FOR Sale: HQ-129-X with speaker, in excellent condition. $125.00 or best offer. Will deliver Delmarva Peninsula or Norfolk area. John A. Byrd, 406 Harbor Ave., Cape Charles, Virginia.

SELL: Meissner Model EX signal shifter. Never used. Carries factory guarantee. A bargain at $50.00. WØIJ, Route 4, Pleasant Hill, Mo.

QSLS: Distinctive designs, glossy. Samples free. Narvestad, Granite Falls, Minn.

FOR Sale: First class equipment, like new: 32V1 Collins, $400.00; 75A1 Collins, $300.00; Model 59 megacycle meter, $135.00; 120-watt modulator, $36.00; dual 600V power supply, $46.00 and a few items left as advertised in Feb. QST. Orval Hanson, WØHBA, Watertown, South Dakota.

HAMFEST: June 4, 1950. Come to Camp Ki-Shau-Wau, where the Starved Rock Radio Club will again hold their annual Hamfest. Follow Hamfest signs south from Junction of Illinois Routes 178 and 71 near Starved Rock State Park or east on Blacktop road from Route 51 at Tonica, Illinois. One dollar advance registration, or one fifty at gate. For additional information, write W9MKS, Utica, Illinois.

SELL: HT-9 transmitter, perfect condition, with ten to eighty meter coils. $200.00. W7ADA, 6252 52nd, NE, Seattle 5, Wash.

A REAL buy! New RME-DB22A Preselector, first $56.00 buys it. W8QJC, Holland, Michigan, 153 Central Ave.

BC610E with speech amplifier and tuning units, coils 10 thru 80, bought new, excellent condition, unconverted, sacrifice best offer. F.o.b. Write W8LR.

BC-348Q for sale: Includes manual and base. In fair condition. $42.00, plus shipping and C.O.D. W8BGH, 3965 Sheridan, Detroit 14, Michigan.

FOR Sale: Collins 32V-2, $495.00 or best offer. Collins 75A-1, $275.00. Both like new. Will consider NC-57, Hammarlund 4-20, or similar equipment on trade. WØSRI, 309 East Third, Hoisington, Kansas.

QSLS. Original designs priced to fit the ham's pocketbook. Stamps for samples. Leonard's Print Shop, 854 View St., Hagerstown, Md.

BARGAIN: Rebuilt Meissner 150B (less VFO) 10-meter Workshop beam and Erecco rotator, $250.00. Come for it. Can't ship. A. H Emery, W2CVT. Dutchess Tpke, Poughkeepsie, N. Y.

COLLINS 75A and 4-125A Kw automatically tuned transmitter described in January–February '48 CQ. First offer over $500.00. WØPKO, 5216 45th Ave., So. Minneapolis, Minn.

WANTED! Circuit diagram or instruction manual for BC-223-AX. W8GWA.

SX-28 SPEAKER, perfect. First $9.00. C. Nichols, W1MRE.

SELL: MB-150, $15.00; MB-20, $6.00; 7.5 Amp Variac, $12.00; 1100-0-1100 pole transformer $15.00; 813, socket, filament transformer $6.00; pair 811's, sockets, transformer $5.00; PE-103, new $11.00; Echophone EC1A, rcvr, fair, $12.00; new 35 inch Bud enclosed rack, gray, $15.00; 125-watt Stancor A-3894 modulation transformer, $8.00; BC454, $3.00; 455, $3.00; 457, $3.00; 458, 250; 900-0-900 @ 225 Ma, $5.00; 16 μfd condenser box, 600 WVDC, $2.00; two 6 ufd @ 1500 WVDC, $1.50 each; 2-in. Handbook oscilloscope, $8.00. W9ICK, Hardin, 110 East Elm, Alton, Ill.

FOR Sale: NC-57 receiver, 4 mos. old; give new guarantee, $75.00; BC375E xmitter, 150 watts 1.5-18 mcs; complete with dynamotor power supply, plugs and 40 m. tuning unit, $25.00; Signatone code oscillator with speaker, $5.00; BC-696A, $12.00; four 6VDC auto storage batteries, $9.00 ea. Q5'er FL-8, $1.00. F.o.b. John H. Ashley, W4OSC, Ware Shoals, South Carolina. Box 254.

FOR Sale: BC-221 frequency meters complete with crystals, tubes, calibration books, $50.00. BC-455 or BC-454 receivers, excellent or new condition, $5.00. SCR-522 with tubes and crystals, $25.00. Hays Sneed, W5RY, 643 Eagle Ave., Jackson, Miss.

WANT cabinet for SX-28. Will consider others taking 19-inch panel. State price. Breeden, W2SIJ, 61-17, 224th Bayside, L. I., N. Y.

SELL practically new, excellent condition; Collins 310B-3 complete, $185.00 and Viking 1 wired, tested, complete, all tubes, $250.00. W5JIZ, 3527 Granada, Dallas, Texas.

BC-610. Want 160 M. Tuning boxes, back covers, lower panels and skirts. Sell exciter tuning boxes, meters, top covers, relays, handles, hardware brackets, cables, etc. Walt Straesser, W8BLR, 15384 Birwood, Detroit 21, Mich.

WANTED: Marconi magnetic detector, multiple tuner; DeForest responder and audion control panels; other wireless gear prior to 1925. Franklin Wingard, Rock Island, Illinois.

MECK 60 now on ten, $80.00; early Meissner shifter, $15.00; AVT-112, $15.00; BC-1206, $5.00, manual on each. All for $100.00. Delivered near Arlington. W4KKI.

WANTED: 32V2, 310C-2, TBS50, RME HF-10-20, DB22A, medium power rig, mobile equipment, signal generator. Box 104, Dyker Station, Brooklyn 28, N. Y.

FOR Sale: BC-779A receiver, SP-44 Panadaptor, Jensen JHP-52 speaker and cabinet, factory-built transmitters, test, P.A. equipment; miscellaneous meters, tubes, parts. List on request. O. G. Hessler, W9OH, 12 Hiawatha Drive, Clarendon Hills, Ill.

CRYSTALS: Precision, low drift; mounted units; 3500 to 9000 kilocycles ± 5 kilocycles, $1.00. Exact frequently $1.50; Specify mounting. Quotations, other frequencies. Breon Laboratories, Williamsport, Penna.

MUNGER rotator, used 2 months, $40.00. R. Van Wuychhuyse, 412 Humboldt St., Rochester, N. Y.

COLLINS 32V-1 or -2 wanted. State condition and cash price first letter. L. B. Lampman, W4SAW, 3204 W. Cervantes, Pensacola, Fla.

SELLING excess equipment: Two Meissner signal shifters, several sets coils; Meissner 8C FM tuner; four type 250TH tubes; Q5'er, BC696, unconverted; RME VHF152A converter, DB22A preselector; frequency meters; several BC221 and LM; quartz crystals, amateur bands and standards; converted SCR522 receiver sections; RUBGF11 phone/cw tranamitter VFO units, 40, 80 output; Lambda MM-2 phone modulation scope; Meissner 150-B 300 watts phone CW operating on six bands; meters, transformers, etc. No junk. Everything guaranteed. Write Post Office Box 1245, Indianapolis, Ind.

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COLLINS 30K, complete; NC-200 rcvr, speaker, realigned by National and in new condx; Genemotor, cables, $12.00; McMurdo 903 all coils, Shure xtal mike, desk stand; Federal DX, Type 58 rcvr, collector's item. Philco AR50 car rcvr, modified for Gon-Set converter, $50. A. J. Brizzolari, W2TG, 42-68 247th St., Little Neck, L. I., N. Y.

FOR Sale: Collins 32V-2 xmitter, $450.00; Collins 75A rcvr, $295.00. Harold O. Powell, W2REJ, Box 182, Clementon, N. J. Can deliver within 100 miles.

NEW PE-103A power unit, 6/12v input, 500v 160 Ma output; moisture-proof, crated; $17.00. Want HT-9 coils for 20, 40 & 80. John Wondergem, W1NDA, General Line School, Newport, R. I.

SELL: SX-24 and Speaker, in excellent condition, unused. Simpson VOM, prop pitch motor, FL-5 filter, new 6-tube farm radio with long life battery, 10BP4, 803 Want: Bug and good camera. W2PUK, Glen Ridge, N. J.

GENERAL Industries 78 RPM recorder and playback turntable, $15.00, PE-103, $8.00; Thordarson 300 Ma xformer, 1000/1500 ea side CT, $7.00; 803, $2.00; 12 Vdc dynamotor, 750 vts 200 Ma., $10.00; QSTs: 1932-1947, less 10 odd issues, $15.00. Ralph Cabanillas, W2BNJ, 355 West 84th St., NYC, N. Y.

TELETYPE FSK panels, custom built, $100.00. Autostart optional. Also kits, punched chassis, filter units. Approved by W2BFD. W2DXK.

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420 Mc. rcvr-trans. Excellent new condition, appearance. Fully converted BC-788 with internal speaker, modulator, 110 v.-60 cyc. supply. Antenna, impedance transformer and coaxial relay available. Cost unconverted $165.00. Sacrifice $175.00. F.o.b. W3PZ, Smith, 218 Newcomb SE, Washington 20, D. C.

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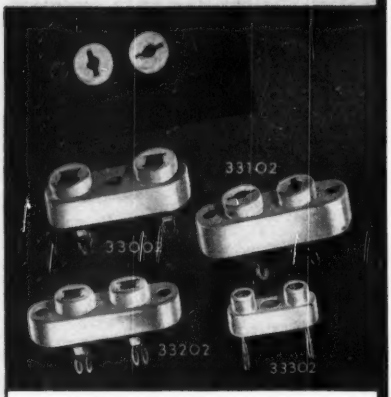

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33302	.050	.500

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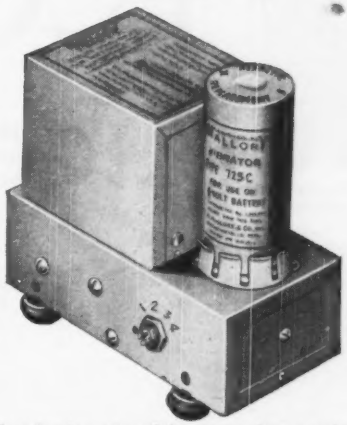
MALLORY HAM BULLETIN

Reliable Power for Mobile Operation



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Your Mallory Distributor will be pleased to give you more information on the Mallory Vibrapack, vibrator power supplies, or if we can be of help in making a recommendation for your rig, communicate with us at P. R. Mallory & Co., Inc., Box 1558, Indianapolis 6, Indiana.

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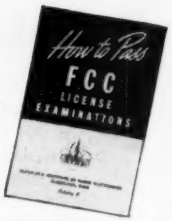

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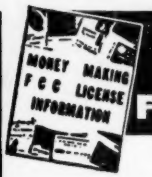

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